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SUMMARY

As required by the National Environmental Policy Act at 40 CFR 1502.12, this section is a summary of the Dos Pobres/San Juan Project Environmental Impact Statement. It focuses on the purpose and need for the Dos Pobres/San Juan Project, alternatives considered, scoping issues analyzed, and impacts of the alternatives.

The Proposed Action analyzed in this Environmental Impact Statement (EIS) is a Mining Plan of Operations (MPO) submitted to the Safford Field Office of the Bureau of Land Management (BLM) by Phelps Dodge Safford, Inc. (PDSI) for the Dos Pobres/San Juan Project (Project). As proposed in the MPO, the Dos Pobres/San Juan Project, located near Safford, Arizona, would consist of two open pit copper mines with one leach pad, one shared solution extraction/electrowinning (SX/EW) processing facility¹, and shared infrastructure and support facilities. In addition to the MPO, the BLM is considering a land exchange alternative with Phelps Dodge (PD) that would enable the Dos Pobres/San Juan Project to proceed without BLM oversight, assuming that PDSI is able to obtain all necessary environmental permits. Authorizing the MPO or approving the land exchange constitute two separate but related federal actions, both of which are addressed in this single EIS per the National Environmental Policy Act (NEPA) of 1969. All the alternatives, with the exception of the No Action alternative under the Mining Plan Alternatives Set, would result in development of the Dos Pobres/San Juan Project within the constraints of federal and state environmental permitting requirements.

The BLM, as the primary decision-making agency for these actions, has determined that an EIS is required and is serving as the lead agency responsible for preparing the EIS. Cooperating agencies are the U.S. Army Corps of Engineers (COE), which has permitting responsibilities under Section 404 of the Clean Water Act for the proposed mining operations, and the U.S. Environmental Protection Agency (EPA), which formerly had permitting responsibility for Section 402 (National Pollutant Discharge Elimination System) of the Clean Water Act. Arizona Department of Environmental Quality (ADEQ) now administers the Section 402 permit program.

PURPOSE AND NEED

The purpose of the Proposed Action (the Dos Pobres/San Juan Project) is to enable PD to develop its mining claims and the mineral resources associated with the Dos Pobres and San Juan leachable copper ore deposits as an integrated project. The Project is necessary for PD, one of the largest manufacturers of copper and copper products, to continue meeting national and worldwide demand for copper.

As an alternative to developing the proposed Project on BLM-managed lands, the BLM and PD have agreed to consider a land exchange. Although the primary purpose and need for the land exchange alternative is to exchange public for private lands to achieve improved management of federal lands and federal acquisition of lands containing important resource values, the exchange alternative is also consistent with the purpose and need for the Proposed Action. Approval of the land exchange would still allow PDSI to develop the Dos Pobres and San Juan ore deposits should PDSI obtain the required federal and state permits to do so. In addition, PD would acquire lands that they anticipate using for possible future development of the nearby Lone Star deposit, which they own. Under either an MPO or a land exchange scenario, the Dos Pobres/San Juan

¹ The copper industry commonly uses the abbreviation "SX" for "solvent extraction" but Phelps Dodge has always called the process "solution extraction".

Summary

Project must be permitted by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, by Arizona Department of Environmental Quality (ADEQ) under Section 402 (Arizona Pollutant Discharge Elimination System) of the Clean Water Act and Arizona Revised Statutes (ARS) 49-241 and 49-408 (Aquifer Protection Permit and Air Quality Permit), among others, prior to implementing the proposed mining operations. Both the Proposed Action alternative and the land exchange alternative are in conformance with the BLM's Safford District (now Field Office) Resource Management Plan, as adopted in the Partial Record of Decision I (BLM 1992a) and the Partial Record of Decision II (BLM 1994b).

The land exchange alternative is the BLM's preferred alternative and is consistent with the land exchange provisions of the Federal Land Policy and Management Act (FLPMA), as amended by the Federal Land Exchange Facilitation Act (FLEFA) and regulations governing federal land exchanges at 43 CFR 2200.

ALTERNATIVES

The five alternatives evaluated in this EIS are presented in two sets: the Mine Plan Alternatives Set and the Land Exchange Alternatives Set. Each set includes a "no action" alternative relative to the agency decisions available within that set (i.e., only BLM can decide to select the Land Exchange alternative). The BLM, as a public lands management agency, must decide whether to approve the land exchange or not; selection of the exchange would negate the need for BLM to select an alternative from the Mine Plan Alternatives Set, as BLM has no jurisdiction over mining on private lands. Regardless of the land ownership of the proposed project area, the COE has jurisdiction over the Project through its Clean Water Act permitting authority, and can only select an alternative from the Mine Plan Alternatives Set.

The BLM's preferred alternative is the Land Exchange alternative; the COE's preferred alternative is the least environmentally damaging, practicable alternative.

Mine Plan Alternatives Set

Proposed Action Alternative

The Dos Pobres/San Juan Project (the Project) is an integrated mining operation that includes the development of two open pit mines, a crushing and material handling system, a common Solution Extraction/Electrowinning (SX/EW) processing facility and shared infrastructure and support facilities. Based upon the current Mining Plan of Operations, the Project will produce approximately 2.9 billion pounds of salable copper over the Project's estimated 16-year mine production life. Project production will include the mining of 626 million tons of oxide and sulfide leach ore and 385 million tons of lower grade and unmineralized material referred to herein as development rock, also known in the copper industry as inert or overburden rock. Total minable material amounts to 1.01 billion tons resulting in a 0.6:1.0 non-ore to ore ratio. Construction of the SX/EW plant and associated support facilities will require approximately 15 months to complete and will start after completion of the Project's environmental permitting requirements. The Project would involve a total of 3,360 acres, currently comprised of 1,429 acres of PD private lands and 1,931 acres of BLM-administered lands.

Mining and Ore Processing Operations. Two open pit mines, Dos Pobres and San Juan, will be developed. The Dos Pobres open pit mine is located entirely on PDSI patented lands. Surrounding the planned Dos Pobres pit is an approximately 1,300-foot setback to allow for potential future mining of the deeper sulfide milling reserves that underlie the leachable ore at Dos Pobres. Leach ore and development rock (unmineralized and low-grade material) will be mined using conventional drilling and blasting techniques to

reduce ore to a manageable size (called run-of-mine or ROM) for loading and hauling. Depending on its copper content, ROM leach ore will be either hauled directly to the leach pad or hauled to a crushing system. Development rock will be hauled to two unlined development rock stockpiles, identified as East and West development rock stockpiles.

Three distinct periods of mining will occur during the 16-year life of the Project. The first period involves mining leach material exclusively from the Dos Pobres deposit during Years 1 through 4. During the second period (Years 5 to 13), mining operations at the Dos Pobres and San Juan deposits will be combined. The third period, Years 14 - 16, will consist entirely of mining the remainder of the San Juan deposit. Mining rates and copper cathode production will decline during this period. The peak mining rate is approximately 94,000,000 tons per year and occurs during the first few years of the Project.

Crushing and Material Handling. The crushing and conveying system is designed to handle 100,000 tons per day (tpd). The crushing plant will be located along the northeastern corner of the leach pad. The crushing facility consists of a three-stage crushing system and an agglomeration system that reduces ROM material to a nominal 0.5-inch minus size. Crushed ore will be moved by conveyor from the crushing plant to the agglomeration facility. Agglomeration drums will tumble the crushed ore with sulfuric acid and water to agglomerate fines to the larger rock particles for a more homogeneous product with uniformly wetted particles. Agglomerated crushed ore will then be delivered to the leach pad by overland conveyor and placed onto the pad by a stacker system.

Leach Pad. A single, rectangular, approximately 922-acre leach pad will be located south of the Dos Pobres pit, between Cottonwood Wash on the east and Watson Wash on the west. The leach pad will be developed from south to north in 20 to 40-foot-high lifts. Based on current projected production rates, the leach pad is expected to reach a height of approximately 400 to 450 feet but will be designed to accommodate a potential ultimate height up to 600 feet. The leach pad will be constructed with setback benches to achieve a final overall slope of no greater than two horizontal to one vertical (2H:1V). The top surface of the pad will ultimately slope at approximately the same degree as the existing natural terrain. The site selected for the leach pad offers sufficient slope (generally steeper than four percent) to allow use of the natural contours of the terrain for collection of pregnant leach solution (PLS).

The key elements of the leach pad design include the pad foundation, a composite liner system consisting of a compacted clayey soil underliner, a synthetic geomembrane liner, and a "buffer" layer of overliner material. The leach pad design includes an internal stormwater collection ditch that will divert clean stormwater away from the pad during early years of operation, when the leach pad is confined to the southern portion of the site below the ditch. Later, this ditch will be incorporated into the leach pad system to provide for internal collection of PLS flows during leaching on the northern portion of the pad. The ditch will intercept PLS flows from the northern portion of the leach pad and direct them to the east edge of the pad where they will flow to the leach pad solution collection channel.

Raffinate, an acidic aqueous solution, will be applied to the leach pad using drip emitters. As the leach solution percolates through the copper-bearing ore, it will dissolve soluble copper minerals contained in the rock. The copper-laden water, called pregnant leach solution, or PLS, will then exit from the lined leach pad and be routed to the lined excess process solution impoundment located at the southeastern toe of the pad, from where it will be routed directly to the PLS collection tank and eventually processed at the SX/EW plant.

Leach Solution Collection/Distribution Facilities. The leach solution collection/distribution system includes the excess process solution impoundment and various piping and conveyance systems. PLS flows greater than that which can be processed by the SX/EW plant are retained in the lined excess process solution

Summary

impoundment, from which they can be routed to the SX plant as required. Excess flows can also be drawn from the excess process solution impoundment into the raffinate tank for return to the leach pad surface.

Solution Extraction and Electrowinning (SX/EW) Processing Facility. The solution extraction (SX) and electrowinning (EW) processing facility will consist of three primary components (SX plant, tank farm, and electrowinning tank house) and is located southwest of the leach pad.

Development Rock Stockpiles. Unmineralized and low grade material (referred to herein as development rock) will be hauled at ROM size to two unlined stockpiles that will not be leached. Development rock stockpiles will occupy approximately 834 acres total. One stockpile will be situated to the west of the Dos Pobres pit (the West development rock stockpile), and the other to the south of the San Juan pit (the East development rock stockpile). Stockpiles will be constructed in 50-foot lifts to approximately 400 feet above ground level. A liner is not proposed for these development rock stockpiles as the material is considered inert because the neutralization capacity of the non-ore material (i.e., development rock) present within the orebody exceeds the rock's acid-generating potential.

Soil and Growth Medium Stockpiles. Seven soil and growth medium stockpiles covering a total of roughly 123 acres will be created for use as growth media and capping material in reclamation.

Water Supply. The average amount of water required for the Project is forecast at 3,431 gallons per minute (gpm) (5,533 acre-feet per year [af/yr]); the total water demand over the life of the project is predicted to be 88,528 acre-feet (af). Groundwater near the Dos Pobres and San Juan mines will be developed for use by the Project. Currently, five 1,350 gpm vertical pumps are planned to be established at wells constructed in the project area. Water will be pumped from wells to water storage tanks that will gravity-feed to various project facilities.

Electric Power. The total average power requirements for the project are estimated to be 59.9 megavolts (mV). The power system for the Project will include construction of about seven miles of a primary 230 kilovolt (kV) transmission line from the existing 230 kV Hackberry line to a main substation that will be located on Phelps Dodge's property west of the Lone Star Road. At the main substation, power will be transformed and distributed via three separate 69 kV overhead transmission lines to the mine areas and facilities.

Compactible Soil Borrow Area. The Lone Star Compactible Soil Borrow Source is located on PD's private lands in Sec. 25, T6S, R26E, approximately 4.5 miles southeast of the leach pad. Material from this borrow source will be used to construct the composite liner system for the leach pad and will be transported by truck to the leach pad along an approximately 110-foot-wide aggregate roadway. The borrow area will ultimately be approximately 49 acres in size.

Shops, Office, Administration, and Communications. A service complex that includes a heavy duty truck shop, maintenance shop, fire truck and ambulance building, cable repair shop, recycling center, oil and lubricant storage, fuel station, and a truck wash facility will be built south of the San Juan mine. Communications for the Project will include hard wiring of a telephone cable in a loop configuration between the main security gate, Site No. 2, the truck shop complex, and the SX/EW plant. Radio communications require construction of a repeater transmitter tower on a hill located south of the San Juan Mine and three base stations for use at the administration building, mine office, and SX/EW facility.

Transportation/Access/Security. New infrastructure requirements for the Project include upgrading existing access roads, constructing employee parking facilities, and establishing additional security gates. Road crossings and access and haul roads will be constructed with culverts or at grade. A fence will be constructed

around the mine facility as needed to provide for security and safety and to keep cattle on adjacent lands off the mine property. Employee parking will be provided at Site No. 2 and the SX/EW plant site.

During the operational phase, average daily traffic is forecasted at 325 employee round trips and 80-90 truck round trips. Of the approximately 80 to 90 truck round trips to and from the Project, about 75 percent (60-68 round trips) are expected to come from the east and south and use the Solomon Bridge to cross the Gila River. The remaining 25 percent of trucks (20-22 round trips) are expected to arrive from the west and use the Thatcher Bridge (Reay Lane Bridge) to access the project site.

Aggregate Materials. Aggregate materials will be used for a variety of purposes, including road base fill material, riprap for stormwater diversion channels and road crossings, aggregate for concrete, and other uses. Two aggregate borrow sources totaling about 146 acres have been identified within the project area, from which approximately 19 million tons of material will be excavated over the life of the Project.

Environmental Protection Measures. A variety of environmental protection measures have been incorporated into the Mining Plan of Operations to meet applicable standards including those of regulatory agencies such as the ADEQ and COE that have review and approval authority over the proposed Project. These measures range from integrated stormwater management programs to concurrent and post-closure reclamation plans. Environmental protection measures that have been incorporated into the mine plan are summarized below.

< **Surface Water Management.** The Project will be constructed and operated as a “zero-discharge” facility, meaning that all process waters and stormwaters that come into contact with process facilities will be contained on-site rather than discharged off-site into waters of the United States. Development of the Project as a zero-discharge facility will necessitate diverting stormwater around the project area to reduce run-on into the pits and ponding against stockpiles, and to prevent release of flows potentially impacted by the leaching or mining operations into surface waters. The stormwater management facilities are designed to ensure that there are no potential points of stormwater discharge from the mines for the 100-year, 24-hour and 100-year, 10-day storm events. The stormwater impoundment will retain all incidental flows (stormwater and leach pad drain-down occurring during a power outage of up to 24-hours in duration) from the leach pad. A series of retention dams located upstream, downstream, and within the footprints of the development rock stockpiles will prevent off-site surface water discharge from storms during the early years of mine development.

Four diversion channels, South, Peterson Wash, West, and Site No. 1, will be constructed upgradient of the stockpiles and open pits to divert clean stormwater runoff around and through the site, preventing the water from being impacted by mining activities.

An integrated stormwater retention management system will be used to control stormwater run-on and runoff from the leach pad and the West and East development rock stockpiles. The system will use a lined stormwater impoundment south (downstream) of the leach pad, and a series of retention dams below, within, and above the footprints of the development rock stockpiles. These facilities were designed (sized) for the worst-case scenario of 100-year/24-hour and 100-year/10-day storm events.

Stormwater entering the leach pad perimeter will be conveyed to the stormwater impoundment designed to contain the 100-year/24-hour design storm event. The impoundment will be lined with a single, 60-mil, High-Density Polyethylene (HDPE) liner over six inches of 3/8-inch-minus, compacted native or natural material such as screened soil. The impoundment is currently designed

Summary

with a storage capacity of approximately 390 acre-feet plus two feet of freeboard. The final design of the stormwater impoundment may not change; however, if revised the design will still provide a minimum total containment volume for 317 af of storage plus freeboard, a volume of sufficient capacity to handle drain-down from the leach stockpile that would occur if there was a 24-hour power outage at the mine concurrent with a 100-year/24-hr storm event. The total surface area of the impoundment footprint is approximately 23 acres.

Diluent, reagents, fuel, and other petroleum products used in the operations will be stored in above-ground tanks within impervious secondary containment systems to avoid possible discharge to surface waters. All tanks will have leak detection systems. Secondary containment systems will have a capacity of at least 110 percent of the volume of the largest tank contained within the secondary containment facility. Sulfuric acid will be stored in tanks located within containment structures that can be drained to other containment facilities, such as the lined leach pad or the SX/EW tankfarm runoff tank. The SX/EW plant will be designed as a zero-discharge facility, incorporating drainage design features and containment tanks.

- < **Groundwater Protection.** Project facilities are subject to the requirements of the State of Arizona's Aquifer Protection Program (APP) managed by the Arizona Department of Environmental Quality (ADEQ). Proposed groundwater protection measures include use of a liner system beneath the leach pad, stormwater controls, pumping systems, tank containment systems, and other features and operations designed to meet APP requirements.

PDSI has incorporated processes, structures, and operating methods that meet Best Available Demonstrated Control Technology (BADCT) into facility designs to protect groundwater and to ensure the greatest degree of discharge reduction achievable. The facility(s) will be developed in a manner that achieves the greatest degree of demonstrable discharge reduction. The leach pad liner system, lined stormwater impoundment, septic tank systems, truckwash, sulfuric acid storage, and other facilities and operations have been designed to meet BADCT criteria.

A conceptual closure and post-closure strategy for the Project has been developed and will be included in the APP application. ADEQ requires conceptual closure strategies in the APP permit application that minimize stormwater run-on and infiltration and/or seepage from mine facilities that would affect aquifer water quality. In general, all potentially discharging facilities will either be closed in place or will undergo clean closure. Closure in place consists of leaving solid materials in place and, if necessary, providing a containment system that meets Best Available Demonstrated Control Technology (BADCT) requirements. Clean closure consists of removing and properly disposing of all liquid and solid waste, unused or recyclable chemicals, and impacted materials from the facility (including removing underlying impacted soils to appropriate industrial health- or risk-based levels).

Waste Management. Solid waste generated at the Project will be disposed of in a manner consistent with ADEQ regulations. Solid waste will be transported off-site to an approved disposal or recycling facility. Office trash will be disposed of at the local landfill near Safford. Used petroleum products will be transported to a contracted recycling company in accordance with state and federal regulations. Nearly all scrap metal, most used HDPE pipe, and some construction debris will be recycled. Wastes determined to be hazardous under state and federal laws will be properly packaged and transported by a permitted transporter to an EPA-approved hazardous waste treatment, storage, or disposal facility. A pollution prevention plan, as required by the ADEQ, will be developed by PDSI prior to Project construction in order to minimize waste generation at the Project through source reduction, reuse, and recycling.

- < **Hazardous Materials Storage, Handling, and Transport.** Sulfuric acid will be shipped to the Project in 3,500-gallon capacity tanker trucks and stored on-site in carbon steel tanks. The operations will include two 2,500-ton (312,500-gal) sulfuric acid storage tanks near the north end of the leach pad for acid addition in the agglomeration system and one 80-ton (10,000-gal) storage tank at the SX/EW facility to provide make-up acid to the SX plant. All three tanks will be situated in acid-resistant, concrete secondary containment facilities that can be drained to other containment areas, such as the lined leach pad and the 1.9-million-gallon stainless steel runoff collection tank located in the tankfarm.

Sulfuric acid consumption rates over the life of the Project are estimated to average about 1,600 tpd (about 200,300 gpd) during years of full production. These rates will require, on average, approximately 70 truck loads of acid per day. Probable sources of sulfuric acid include existing copper smelting operations northwest of the Project in Globe, Arizona, or to the east at Hurley, New Mexico, where sulfuric acid is a byproduct.

Reagents used and stored in the SX/EW area include diluent, extractant, and cobalt sulfate. These reagents will be stored in tanks located in the SX/EW tankfarm. The tankfarm is designed as a containment area. Process solution bypasses and stormwater runoff are collected in the tankfarm drainage system, which incorporates the 1.9-million gallon runoff tank located within the tankfarm.

Diesel fuel and gasoline will be supplied to the Project by tanker trucks. The trucks will travel directly to one of three fueling stations and offload into above ground storage tanks that will be provided with secondary containment systems. Storage tanks for this fueling station will be within a bermed area lined with polyvinyl chloride (PVC) or HDPE.

- < **Air Quality Control Permit.** The Project will meet all applicable state and federal air quality standards. These standards prescribe emission limits, operational practices and administrative requirements. The purpose of these standards is to ensure that emissions are sufficiently reduced so as to prevent any exceedances of health-based, maximum allowable ambient concentrations.

Closure and Reclamation Measures. In addition to the conceptual closure plan submitted in its APP permit application, PDSI prepared and submitted a reclamation plan to the BLM. This plan was developed to meet both federal and state reclamation requirements. The reclamation measures presented in the plan were intended to achieve productive post-mining land uses (PMLU) as required by both federal and state regulations. Types of PMLUs envisioned for the project area include 1) wildlife habitat and limited grazing; 2) recreation, tourism, and education; 3) industrial development; 4) future mineral exploration and mine development; and 5) management of environmental resources including visual, air, water, and soil.

- < **Leach Pad.** At closure, the leach pad will be allowed to drain to remove residual process solutions, consistent with APP requirements. To achieve the PMLU of wildlife habitat and limited grazing, revegetation with native species will occur in 100 percent of the surface area of the top of the leach pad. A test program will be undertaken concurrently with mine operation to determine the optimum method for reclamation of the leach pad side-slopes and will involve rinsing the surface of the flat area of the setback and outer slope with fresh water to remove residual salts. Following rinsing, the outer slopes and the flat area of the setback will be capped with approximately 12 inches of Basin Fill sediment or comparable growth medium and seeded with native species.

- < **Development Rock Stockpiles.** To support the wildlife habitat and limited grazing PMLUs planned for the development rock stockpiles, 1) PDSI will construct stormwater diversions and management

Summary

systems; 2) the top surfaces of the development rock stockpiles will be graded during final placement of material to minimize random ponding and infiltration, to direct stormwater flows to compacted areas within the interior of the surface area for collection and evaporation, and to arrive at the final configuration, and the top portions of slopes will be crown chained or dozed to stabilize slope faces; and 3) revegetation with native species will occur on 100 percent of the surface area of the top of the development rock stockpiles.

- < **Open Pits.** Revegetation of pit areas would interfere with potential future mining opportunities in the Mining District and therefore is not proposed. The open pit areas will be maintained for possible future access to mineral resources. Through time, a pit lake is expected to develop in each of the open pits but water quality within the pit lakes is expected to be satisfactory and specific remedies or reclamation activities are not anticipated to be necessary.
- < **Roads and Traffic.** The post-reclamation configuration of roads has been designed to meet the access requirements for future industrial uses, education, and tourism uses, maintenance and security functions, and environmental monitoring. Approximately 160 acres of haul roads (excluding areas within the pits) and approximately 45 acres of new access roads will exist at the project site upon closure. Paved roads will be retained and maintained for long-term site access.

Reclamation Costs and Bonding. The estimated total cost to implement the proposed closure and reclamation measures is \$10,992,000 (2003 dollars), which includes \$1,066,000 in costs for closure requirements identified for PD's Aquifer Protection Permit and \$9,926,000 in costs for reclamation measures. In consultation with BLM and the State Mine Inspector, PD will select an appropriate financial assurance mechanism(s) for reclamation costs. Potential financial assurance mechanisms include any one or a combination of the following: surety bond, cash, irrevocable letter of credit, certificates of deposit or savings accounts, securities or bonds, or insurance.

Projected Employment. The Project will provide both short-term construction employment and long-term employment in the form of direct employment by PDSI, local contractor employment in direct support of project operations, and local indirect employment (jobs created or maintained as a result of direct employee needs for goods and services). For the operational phase of the Project (16 years), approximately 250 full-time employees, with an average annual per-capita salary of \$36,000 (1997 dollars) plus benefits, will be employed annually by PDSI. It is expected that roughly 80 percent or more of the positions would be filled by applicants residing in the local Graham and Greenlee counties area, including some PD employees currently working at PD's Morenci Mine. PDSI estimates that local contractors will employ approximately 100 people to provide direct support services for the Project. A portion of these contractors will work onsite at the Project while the remainder will provide certain maintenance and fabrication services out of local shops. Because of the Project's proximity to the San Carlos Apache Reservation, employment opportunities for tribal members will be available through both direct employment and through contractors that may be located on the Reservation. Estimated total payrolls for local contractors working at or for the Project range from \$2.5 to \$3.0 million annually.

Partial Backfill of San Juan Alternative

This action alternative proposes mining, processing, mine support, environmental protection, closure and reclamation, and employment that are identical to those of the Proposed Action with one exception: approximately 60 - 80 million tons of development rock would be backfilled into the mined-out portion of the San Juan pit instead of placed on the West and East development rock stockpiles. As a result, the ultimate heights of both development rock stockpiles would be approximately one lift (about 50 ft) lower than the

heights anticipated for the Proposed Action alternative. This alternative would also preclude future potential development of any copper resources remaining in the San Juan pit that are not economic to mine at this time.

No Action Alternative

This alternative involves no federal actions – the COE would not issue its Clean Water Act Section 404 permit and BLM would reject the MPO on the basis of undue or unnecessary degradation of the environment. The result would be no mining on public lands. This alternative does not meet the purpose and need for the project but is a requirement under NEPA.

Land Exchange Alternatives Set

Land Exchange Alternative

This alternative proposes exchange of approximately 16,297 acres of public lands desired by PDSI for approximately 3,867 acres of private lands that PD owns in five counties in Arizona. In disposing of the selected lands, BLM relinquishes authority for those lands, including oversight of the MPO, reclamation, and post-mining land uses. Under this alternative, the State Mine Inspector's Office would have jurisdiction over reclamation on the selected lands. The selected and offered lands and their foreseeable uses under the exchange are described below.

Selected Lands and Their Foreseeable Uses. The approximately 16,297 acres of selected lands are located north of Safford on the southern slopes of the Gila Mountains. These lands, which are heavily encumbered by PD-owned lode mining claims, would be used in the near term for mining, as described under the Proposed Action alternative, including continued use of an office building and other facilities located on the Sanchez parcel for mining support-related activities such as mine process technology research. Other foreseeable uses of the selected lands would include support for potential future development activities for the known Dos Pobres deep sulfide and Lone Star oxide deposits, both of which are located on existing PD lands. Assuming all required permits and clearances are received, these potential projects could be implemented during the latter period of mining at the Dos Pobres/San Juan Project.

The Dos Pobres deep sulfide and Lone Star oxide projects are still conceptual and only general footprints of potential disturbance are available at this time. The potential mining activities and facilities associated with these conceptual plans have been identified by PDSI and categorized into three types of foreseeable uses of the selected lands. The first foreseeable use category, referred to as Production Operations and Support Areas, would include uses such as open pits, leach pad(s), stockpiles, SX/EW processing facilities, support facilities, tailings impoundment, concentrator, and haul roads. This use category for both the Dos Pobres deep sulfide and the Lone Star projects would affect approximately 1,730 acres of the selected lands and 7,578 acres of PD lands. The Transitional foreseeable uses category, in which mine dump runout areas and access roads would be located, would affect 356 acres of BLM land and 785 acres of PD lands. The third foreseeable use category, Intermittent uses, would involve use of the lands for spatial, safety, and site security buffers, and would affect 12,280 acres of BLM lands and 9,848 acres of PD lands.

Offered Lands and Their Foreseeable Uses. The 11 offered properties are located within special management areas or areas identified by the Safford Field Office as Long-Term Management Areas (LTMA). Offered lands comprise the Amado and Curtis properties located in the Gila Box RNCA; the Musnicki, Freeland, and Butler-Borg properties located in the Dos Cabezas Mountains LTMA; the Schock, Feulner, Clyne I and Clyne II properties in the Empire-Cienega LTMA; the Norton property in the Southwest Gila Valley LTMA; and the Tavasci Marsh property in the congressionally designated boundary of the Tuzigoot National

Summary

Monument. The foreseeable uses of these 11 offered properties with regard to public lands uses such as grazing, mineral entry, and recreation, would be consistent with the management decisions approved in applicable federal management or activity plan. These include the Final Gila Box Management Plan for the Amado and most of the Curtis property; the Safford District RMP, as amended, for the remainder of the Curtis property, Norton, Musnicki, Freeland, and Butler-Borg properties; the Proposed Las Cienegas Resource Conservation Area Management Plan for the Schock, Feulner, Clyne I, and II properties; and the Tuzigoot Statement for Management for the Tavasci Marsh property.

No Land Exchange Alternative

This alternative involves no land exchange, which would result in BLM retaining the selected lands under public management and PD retaining ownership and management of the 11 offered properties. This alternative would require the BLM to make a decision under the Mine Plan Alternatives Set regarding the MPO submitted by PD and if an action alternative is selected, oversee implementation of the MPO, reclamation, and post-mining land uses on BLM lands. Impacts of this alternative include direct and indirect realty-related impacts of the exchange itself and the foreseeable uses of the selected lands would result in the mining impacts described under the Proposed Action as well as impacts anticipated to result from the future potential Dos Pobres sulfide and Lone Star projects.

SCOPING ISSUES

Two scoping efforts were made for this Project; an initial scoping took place in December 1994 and a second scoping occurred in October 1996 after PDSI submitted their MPO. The summary of the scoping issues analyzed in this EIS as determined by the Interdisciplinary Team for this EIS is presented in Table S-1 below; see also Table 1-4 in the body of the document.

Table S-1. Summary of Scoping Issues Analyzed in the Dos Pobres/San Juan Project EIS

- 9 Land Use
 - Public Lands Management
 - Access and Recreation
 - Encumbrances
 - Agriculture and Grazing
 - Mineral Rights
 - Surface Water Rights
 - Noise and Vibrations
 - Visual Resources
 - Hazardous Materials
 - 9 Physical Resources
 - Climate
 - Air Quality
 - Geology
 - Soil
 - Groundwater Quality/Quantity
 - Surface Water Quality/Quantity, including Waters of the U.S.
 - 9 Biological Resources
 - Vegetation
 - Wildlife Resources
 - Special Interest Species/Critical Habitat
 - Biodiversity
 - 9 Cultural Resources
 - Archaeological Resources
 - Traditional Cultural Properties
 - 9 Socioeconomic Resources
 - Population and Demographics
 - Local and Regional Economy
 - Infrastructure
 - Transportation
 - 9 Indian Trust Resources
 - Indian Trust Assets
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IMPACTS

Table 2-15 in the body of the document (Volume 1) presents a comprehensive, comparative summary of the direct, indirect, and cumulative impacts of the all five alternatives evaluated in this EIS. The basis for this summary is the detailed environmental analyses provided in Chapter 4 of the EIS.

MITIGATION

Wherever possible, mitigation measures have been developed and incorporated into the Proposed Action or other alternatives to minimize or mitigate potentially adverse impacts. Table 4-45 in the body of the document (Volume 1) summarizes the mitigation measures that would be implemented under each alternative.

CHAPTER 1

PURPOSE AND NEED

1.1 INTRODUCTION

The Proposed Action analyzed in this Environmental Impact Statement (EIS) is the Dos Pobres/San Juan Project, as described in a Mining Plan of Operations (MPO) submitted to the Safford Field Office of the Bureau of Land Management (BLM) by Phelps Dodge Safford, Inc. (PDSI)². As proposed in the MPO, the Dos Pobres/San Juan Project (Project), located near Safford, Graham County, Arizona, would consist of two open pit copper mines with one leach pad, one shared solution extraction/electrowinning (SX/EW) processing facility, and shared infrastructure and support facilities. As an alternative to approval of the MPO, the BLM is considering a land exchange alternative with Phelps Dodge (PD) that would enable the Dos Pobres/San Juan Project to proceed on private lands without BLM oversight, assuming that PDSI is able to obtain all necessary environmental permits. Authorizing the MPO or approving the land exchange constitutes two separate but related federal actions, both of which are addressed in this single EIS per the National Environmental Policy Act (NEPA) of 1969. To keep the distinction between the two actions clear, the alternatives presented and analyzed in this document have been grouped into two sets: a Mining Plan Alternatives Set (including the MPO, which is the Proposed Action) and a Land Exchange Alternatives Set. Each set includes a “No Action” alternative pertinent to the decision(s) to be made by the agencies cooperating on this EIS. All the alternatives, with the exception of the No Action alternative under the Mining Plan Alternatives Set, would result in development of the Dos Pobres/San Juan Project within the constraints of federal and state environmental permitting requirements.

Both a proposed MPO and a proposed land exchange involving public lands are subject to review under NEPA. The BLM, as the primary decision-making agency for these actions, has determined that an EIS is required and is serving as the lead agency responsible for preparation of the EIS. Cooperating agencies are the U.S. Army Corps of Engineers (COE), which has permitting responsibilities under the Clean Water Act, and the Environmental Protection Agency (EPA). Resource specialists from the BLM make up the Interdisciplinary Team (ID Team), who, along with representatives of the cooperating agencies, form the group responsible for the preparation of this EIS.

1.2 DOCUMENT ORGANIZATION

This Final Environmental Impact Statement (FEIS) follows the basic format guidelines provided by the Council on Environmental Quality (CEQ) at Section 1502 of Title 40 of the Code of Federal Regulations (40 CFR § 1502). The FEIS is presented in two volumes to facilitate simultaneous review of text and figures. Volume 1 includes seven chapters and front and back matter; Volume 2 includes figures and appendices. The Table of Contents identifies the key sections and subsections within each of the seven chapters. A brief summary of the content of each chapter is provided below.

² Phelps Dodge Safford, Inc. is a wholly owned subsidiary of Phelps Dodge Corporation. In this document, the abbreviation “PDSI” refers to Phelps Dodge Safford, Inc.; “PD” refers to the parent corporation and its subsidiary operations held under the mining division named Phelps Dodge Mining Company.

Chapter 1

Chapter 1, “Purpose and Need,” summarizes the Project’s history, identifies the Project’s purpose and need, describes the decisions to be made by the lead and cooperating agencies, provides the regulatory framework that guides those decisions, summarizes the issues raised during public and agency scoping efforts, and provides a matrix for tracking scoping issues analyzed in this EIS.

Chapter 2, “Alternatives,” describes the processes used by the ID Team to formulate alternatives, describes the two sets of alternatives that are analyzed in detail (i.e., the Mine Plan Alternatives Set and Land Exchange Alternatives Set, both of which include a No Action alternative); identifies alternatives considered but not analyzed in detail; and provides a comparative summary of the environmental impacts of the alternatives.

Chapter 3, “Affected Environment,” describes the existing environment potentially affected by the Project, specifically those resources identified during scoping, and discusses the resources involved in both the MPO and the land exchange alternatives. This section describes the baseline conditions for determining the potential effects of the alternatives.

Chapter 4, “Environmental Consequences,” analyzes the direct, indirect, and cumulative impacts of the Proposed Action and its alternatives on the existing environment. This chapter provides the analyses for the summary table of impacts provided in Chapter 2.

Chapter 5, “Consultation and Coordination,” summarizes the efforts of the agencies to inform the public, including federal, state, and local agencies, and to involve them in the analysis of the Project’s impacts. Also included in this chapter is a summary determination of whether the environmental analysis for the Project has complied with Executive Order 12898 regarding Environmental Justice.

Chapter 6, “List of Preparers,” identifies those persons primarily responsible for contributing to the preparation of this EIS and lists their qualifications.

Chapter 7, “Responses to Comments,” summarizes the DEIS public notification and comment processes, provides excerpts of comments, and gives specific and general responses to substantive comments received on the DEIS.

1.3 PROJECT HISTORY AND BACKGROUND

The Dos Pobres/San Juan Project is located in the Safford Mining District in Graham County, Arizona, about seven to eight miles north of the City of Safford (Figure 1-1). The Safford Mining District consists of four known, undeveloped porphyry copper deposits (Dos Pobres, San Juan, Lone Star, and Sanchez) located along the southwestern slope of the Gila Mountains north of the Gila River. Most of these mineral deposits are located on land owned by PD, but some extend onto public lands administered by the BLM. The portions of the deposits on BLM land are controlled by PD through mining claims filed under the auspices of the General Mining Law of 1872.

In 1994, in an effort to consolidate their surface and mineral holdings in the Safford Mining District, PD proposed a land exchange with the BLM and both parties later signed an Agreement to Initiate (ATI), which begins formal consideration of the land exchange. Through the proposed exchange, PD would acquire public lands (referred to as the selected lands) within and adjacent to its existing private property in the Mining

District in trade for other lands (the offered lands) in Arizona currently owned by PD. Figure 1-2 shows the selected lands and the project area³ in relation to the general layout of the mine plan.

The BLM determined that, before making a decision about the land exchange, they would prepare an EIS to comply with provisions of NEPA. After the parties agreed to formally consider a land exchange, public scoping took place in late fall of 1994 and baseline studies commenced. Late in 1995, PD learned that the COE would likely require an EIS as part of their environmental review for a Section 404 permit to implement the foreseeable mining uses if the land exchange was authorized. About the same time, PD accelerated the planning and development schedules for the Dos Pobres/San Juan Project. PD submitted a Mining Plan of Operations (MPO) in May 1996, which allowed the BLM, COE, and EPA as cooperating agencies, to consolidate their respective environmental reviews for the proposed mining activities (Note: EPA no longer has permit authority in Arizona through Section 402 of the CWA and will not be issuing a permit). Analysis of the MPO alternative provides agency decision-makers and the general public with more detailed and specific information on which to assess potential impacts from the foreseeable mining uses of the selected lands and also conforms with CEQ regulations at 43 CFR 1502.4 and guidelines in "NEPA's Forty Most Asked Questions."

Development of the selected lands through an MPO entails requesting approval from the BLM to develop the Dos Pobres/San Juan Project on public lands pursuant to the General Mining Law of 1872 and surface management regulations at 43 CFR 3809. After PD submitted their MPO, called the *Dos Pobres/San Juan Project Plan of Operations*, to BLM in May 1996, they established Phelps Dodge Safford, Inc. (PDSI) as a wholly owned subsidiary to be the operating entity to oversee the Project. In December 1996, PDSI submitted a revised MPO, which included several minor revisions as ongoing mine planning studies were completed (PDSI 1996).

In response to PDSI's submittal of an MPO, the BLM 1) determined that the EIS should reflect the fact that an MPO is now the Proposed Action; 2) made the land exchange proposal one alternative to the MPO; and 3) involved the COE, which has responsibilities for the Clean Water Act (CWA) Section 404 permitting requirements of the MPO, and the EPA as cooperating agencies in the EIS process. The EIS was renamed the *Dos Pobres/San Juan Project Environmental Impact Statement*.

BLM then reinitiated the scoping process in 1996 because submittal of the MPO was a significant change in scope from the original land exchange proposal. Public scoping efforts for the Project are summarized in Section 1.6 of this chapter and are described in more detail in Chapter 5. In December 1997, BIA became a cooperating agency in the preparation of this EIS specifically to contribute its expertise in the areas of Indian Trust Resources and tribal consultation.

In September 1998, the Draft EIS was published, followed by a 60-day public comment period that was extended twice, and during which public and tribal open house meetings were held in four locations. A lengthy and detailed review of the groundwater model, its results, and the Model, Monitor, and Mitigate (3M) Program by BIA, their consultant, and BLM hydrologists occurred through fall of 2002. During this review, which BLM believes affirmed the validity of the modeling approach, the BIA withdrew as a cooperator in June 2000 without facilitating consultations with Indian tribes regarding potential impacts to trust resources. In April 2001, BLM reinitiated direct consultations with the Gila River Indian Community and the San Carlos Apache Tribe, which are ongoing.

³ Throughout this document, the term "project area" refers to both the public lands selected for the proposed land exchange as well as the public and private lands potentially impacted by the MPO.

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As recently as August 2001, PDSI submitted an updated MPO (PDSI 2001) that addressed several concerns raised during the DEIS public comment period. Specifically, PDSI modified the crushing, pretreatment, and material handling elements of the MPO to reduce impacts and increase the efficiencies of the ore production processes. As a result of PD's continuing optimization efforts, the projected water usage, truck haulage and associated air emissions, tank storage, and sulfuric acid truck deliveries have been meaningfully reduced. The subsequent reductions in anticipated impacts to water quantity, air quality, traffic, nighttime lighting, and other resources are reflected in the updated analyses presented in Chapter 4.

1.4 PURPOSE AND NEED FOR ACTION

Phelps Dodge currently owns approximately 20,000 acres of land north of Safford, Arizona, which includes all of the Dos Pobres copper deposit and portions of the nearby San Juan deposit. Additionally, PD holds existing lode mining claims to both the remainder of the San Juan deposit, which is on adjacent BLM-managed federal lands, and to mineral resources on federal lands surrounding both deposits. The proximity of the Dos Pobres and San Juan orebodies to one another provides an opportunity for PD to increase mining efficiency by combining certain elements of mine infrastructure. PD would like to develop both the Dos Pobres and San Juan orebodies, and because some BLM-managed land would be involved in mine development, PD has submitted a mining plan of operations (MPO) to BLM. BLM, under the authority of the 1872 General Mining Law, as amended, and BLM's Surface Management Regulations at 43 CFR 3809, must respond to PD's proposed MPO for the Dos Pobres/San Juan Project.

The purpose of the Proposed Action (the Dos Pobres/San Juan Project) is to enable PD to develop its mining claims and the mineral resources associated with the Dos Pobres and San Juan leachable copper ore deposits as an integrated project. The Project is necessary for PD, one of the largest manufacturers of copper and copper products, to continue meeting national and worldwide demand for copper.

As an alternative to developing the proposed Project on BLM-managed lands, the BLM and PD have agreed to consider a land exchange. Although the primary purpose and need for the land exchange alternative is to exchange public for private lands to achieve improved management of federal lands and federal acquisition of lands containing important resource values, the exchange alternative is also consistent with the purpose and need for the Proposed Action. Approval of the land exchange would still allow PD to develop the Dos Pobres and San Juan ore deposits should PD obtain the required federal and state permits to do so. In addition, PD would acquire lands that they anticipate using for possible future development of the nearby Lone Star deposit, which they own. Under either an MPO or a land exchange scenario, the Dos Pobres/San Juan Project must be authorized by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, and by Arizona Department of Environmental Quality (ADEQ) under the State of Arizona Pollutant Discharge Elimination System (AZPDES) and Arizona Revised Statutes (ARS) 49-241 and 49-408 (Aquifer Protection Permit and Air Quality Permit), among others permits and authorizations, prior to implementing the proposed mining operations. Both the Proposed Action alternative and the land exchange alternative are in conformance with the BLM's Safford District (now Field Office) Resource Management Plan, as adopted in the Partial Record of Decision I (BLM 1992a) and the Partial Record of Decision II (USDI BLM 1994b).

The land exchange alternative is the BLM's preferred alternative and is consistent with the land exchange provisions of the Federal Land Policy and Management Act (FLPMA), as amended by the Federal Land Exchange Facilitation Act (FLEFA) and regulations governing federal land exchanges at 43 CFR 2200.

1.4.1 Decisions to be Made

The BLM and COE will make their respective decisions based upon the environmental analyses documented herein. The BLM will issue a Record of Decision (ROD) regarding the land exchange or the MPO and the COE will issue a separate ROD with its permit decision. Figure 1-3 graphically depicts the federal agency decisions that are to be made in this process and the outcomes that would result from the respective decisions made by BLM and COE. The decisions to be made by the BLM and COE are summarized below.

The BLM's authorizing official must:

- < approve the land exchange alternative; *or*
- < approve the proposed MPO; *or*
- < in the event that analysis shows that the proposed MPO would cause unnecessary or undue degradation of the environment, select a mining plan alternative that would not cause such degradation; *or*
- < select the No Action alternative if analysis shows that unnecessary or undue degradation of the environment would occur from the proposed MPO *and* any other mining plan alternative under consideration.

The BLM manages the public lands that would be affected by both the proposed mining activity and the proposed land exchange. As such, the BLM has regulatory oversight responsibilities under 43 CFR 3809 and could select one of the mining plan alternatives or, if it determines that both mine plan alternatives would result in unnecessary or undue degradation of the environment,⁴ select the No Action alternative under the Mining Plan Alternatives Set. On the other hand, if the BLM decides to trade the selected land into private ownership by choosing to authorize the land exchange alternative, it would relinquish its regulatory oversight responsibilities for those lands and, consequently, its involvement with the Dos Pobres/San Juan Project, and the choice of mine plan alternatives (see Figure 1-3).

The COE's authorizing official must:

- < issue PDSI an individual CWA Section 404 permit for the discharge of dredged or fill material into waters of the United States based upon a mine plan alternative in this EIS; *or*
- < select the No Action alternative and deny the permit.

The COE has no jurisdiction over the exchange of public lands, therefore, its authority extends only to the environmental impacts of the proposed mining operations, and its permitting responsibilities are the same whether the proposed mining operations take place on public land or on private land. The COE will select one of the mine plan alternatives on which to issue its Section 404 permit or will select the No Action (no permit) alternative under the Mining Plan Alternatives Set.

⁴ Unnecessary or undue degradation means surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations [43 CFR § 3809.5].

1.5 REGULATORY FRAMEWORK AND AUTHORIZING ACTIONS

The proposed Project and its alternatives must conform with numerous federal, state, and local laws and regulations. The major federal laws and regulations that provide the BLM, and COE with the ability to authorize various aspects of the Project, including a land exchange alternative, are briefly discussed below.

1.5.1 Mining Plan of Operations

As part of its mission to manage multiple resources on public lands, the Department of the Interior (through the BLM) maintains a policy, as decreed by Congress, to encourage the development of federal mineral resources and reclamation of public lands. By submitting an MPO to the BLM, PDSI has invoked plan approval procedures found at 43 CFR 3809.400⁵ and within the Safford District's Resource Management Plan (RMP) as amended (BLM 1991, 1994b). Under these procedures, and as required by NEPA, the BLM is required to analyze the proposed MPO to ensure that:

- < adequate provisions are included in the mine plan to prevent undue or unnecessary degradation of federal lands as a result of authorized mining activities;
- < measures are included to provide for reclamation of disturbed land; and
- < proposed operations would comply with other applicable federal and state laws and regulations.

The provisions of the General Mining Law of 1872; the Federal Land Policy and Management Act (FLPMA) of 1976; the Mining and Mineral Policy Act of 1970; and the National Materials and Minerals Policy, Research, and Development Act of 1980 authorize PDSI to operate a mine on public lands under an approved MPO, assuming all necessary environmental permits and authorizations are received. Table 1-1 summarizes permits and authorizations necessary to implement the proposed mining and/or the land exchange.

Included among the permits that PDSI must obtain to begin mining activities are two federally issued permits required by provisions of the Clean Water Act (CWA). The COE has assumed a cooperating agency role in this EIS process because of its permitting authority over these aspects of the proposed Project. A Section 404 permit is issued by the COE to control the discharge of dredged and/or fill material into waters of the United States (WUS),⁶ including adjacent wetlands. Typical mining and mining-support activities that would require a Section 404 permit include constructing stormwater management facilities and road crossings over drainages, stockpiling leach ore and development rock in WUS, and engaging in any other activity that results in a discharge of dredged and/or fill material into a WUS (33 CFR 323). Through issuance of this federal

⁵ The regulations at 43 CFR 3809 were revised effective January 20, 2001 and then revised again effective January 21, 2002; however, except for reclamation bonding requirements, this project is grandfathered under the 1980 regulations. It was recognized by the BLM in the revisions of the regulations that if a draft EIS for an MPO had already been prepared and issued to the public by January 20, 2001 (as in the case of the Dos Pobres/San Juan Project), then the MPO would not be subject to the new mining plan content requirements or performance standards. The performance standards of the current and 1980 regulations, however, are essentially the same. The only significant difference is the new regulations also address acid mine drainage and the use of cyanide and other leachates. Moreover, the PD MPO addresses all performance standards listed in the regulations effective January 20, 2001, as well as those in the current and original regulations.

⁶ "The Clean Water Act defines this as surface waters, including streams, streambeds, rivers, lakes, reservoirs, arroyos, washes, and other ephemeral watercourses and wetlands" (COE 1993).

permit, the COE has regulatory jurisdiction over aspects of the proposed Project, regardless of whether it is implemented on public lands or on private lands.

Another major Clean Water Act permit required for this Project is the Arizona Pollutant Discharge Elimination System (AZPDES) permit issued by the ADEQ for point source and general stormwater discharges into Waters of the U.S. Formerly under the jurisdiction of the EPA and known as the 402, NPDES, or National Pollutant Discharge Elimination System permit, the permit authority was delegated to ADEQ in December 2002 and is now called AZPDES. This permit continues to distinguish between three types of discharges that are regulated: stormwater, process wastewaters, and mine drainage. Stormwater includes snowmelt; surface drainage that does not come in contact with raw materials, product, or mine drainage; and runoff from waste rock piles, some kinds of access roads, dikes not constructed of development rock, and certain ancillary structures or reclaimed areas. Facilities discharging stormwater are required to prepare a Stormwater Pollution Prevention Plan.

Process waters are prohibited from being discharged and include leach pad runoff or seepage and pregnant leach solutions. Mine drainage is any water drained, pumped, or siphoned from a mine (including pits or adits), and includes process waters mixed with stormwater and stormwater that comes into contact with any materials used in the mining process. Such drainage must meet nationwide, technology-based effluent limitations (40 CFR 440) and state water quality standards for numerous specific pollutants. If the technology-based effluent limitations and state water quality standards differ, ADEQ selects the most stringent limitation for each parameter of concern. Before issuance of the final AZPDES permit, a draft permit will be circulated to the public for a minimum 30-day public comment period. Although the EPA remains a cooperating agency in the preparation of this EIS, the AZPDES permit for the Project would be issued by ADEQ.

Emissions addressed during the permitting process include particulates (dust) from mining and crushing operations, sulfuric acid mist from electrowinning operations, combustion gases from boilers, and volatile organic compounds (VOC) from solution extraction and fuel storage operations. The Air Quality Control Permit to be issued by ADEQ will specify the applicable emission limits for project operations and/or

Table 1-1. Federal, State and Local Regulatory Requirements Applicable to the Dos Pobres/San Juan Project and Alternatives

LAWS/REGULATIONS	REGULATES	APPLIES TO	
		MPO*	Land Exchange**
FEDERAL			
General Mining Law of 1872; 17 Stat. 94	federal minerals	U	--
Mining and Mineral Policy Act (1970); 30 USC § 21a	federal minerals	U	--
Nat'l Materials & Mineral Policy, Research, & Development Act (1980) 30 USC § 1601-1605	federal minerals	U	--
Federal Land Policy & Management Act (FLPMA) of 1976; 43 USC § 1701 (as amended by FLEFA)	management of federal lands	U	U
BLM Mining Regulations at 43 CFR § 3809	federal minerals	U	--
Mining Claim Occupancy Regulations at 43 CFR § 3715	federal minerals	U	--
National Environmental Policy Act (NEPA) (1969) 42 USC §§ 4321 <i>et seq.</i> , as amended	federal undertakings	U	U

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Federal Land Exchange Facilitation Act (FLEFA); 43 USC § 1716, § 1740	federal land exchanges	--	U
American Indian Religious Freedom Act (AIRFA); 42 USC §§ 1996	Native Am. religious places and access	U	U

Table 1-1, continued. Federal, State and Local Regulatory Requirements Applicable to the Dos Pobres/San Juan Project and Alternatives

LAWS/REGULATIONS	REGULATES	APPLIES TO	
		MPO*	Land Exchange**
Native Am. Graves Protection & Repatriation Act (NAGPRA); 25 USC §§ 3001 <i>et seq.</i>	treatment of human remains and affiliated cultural items	U	U
Archaeological Resources Protection Act (ARPA); 16 USC §§ 470	archaeological resources	U	U
National Historic Preservation Act (NHPA); 16 USC §§ 470 <i>et seq.</i>	historic properties incl. TCPs	U	U
Clean Air Act (CAA); 42 USC §§ 7401 <i>et seq.</i>	air quality	U	U
Safe Drinking Water Act (SDWA); 42 USC § 300f <i>et seq.</i>	drinking water quality	U	U
Clean Water Act (CWA); 33 USC § 1344 <i>et seq.</i>	surface water quality	U	U
Endangered Species Act (ESA); 16 USC §§ 1531 <i>et seq.</i> , as amended	threat. & endang. species	U	U
Resource Conservation and Recovery Act (RCRA); 42 USC § 6901 <i>et seq.</i>	hazardous or solid waste	U	U
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); 42 USC § 9615	hazardous or solid waste	U	U
Emergency Planning & Community Right-to-Know Act (EPCRA) of 1986; 42 USC § 11005	hazardous or toxic materials	U	U
Pollution Prevention Act of 1990	hazardous or toxic materials	U	U
Executive Order 11988	floodplain management	U	U
Executive Order 12898	environmental justice	U	U
Executive Order 11990	wetlands	U	U
Executive Order 13007	Indian sacred sites	U	U
Executive Order 13112	invasive, nonnative species	U	U
STATE AND LOCAL			
Environmental Quality Act (EQA) - Aquifer Protection Permit ARS 49-241-251	aquifer water quality	U	U
Section 401 State Water Quality Certification	surface water quality	U	U
Arizona Pollutant Discharge Elimination System (AZPDES)	surface water quality	U	U
Comprehensive Air Quality Act - Air Quality Permit; ARS 49-408	air quality	U	U

Purpose and Need

Arizona Mined Lands Reclamation Act; ARS 27-901-1026	mining reclamation	--	U
Transmission Line Certificate of Environmental Compatibility, ARS 40-360	transmission line siting	U	U
Well Permits; ARS 45-592	wells	U	U

Table 1-1, continued. Federal, State and Local Regulatory Requirements Applicable to the Dos Pobres/San Juan Project and Alternatives

LAWS/REGULATIONS	REGULATES	APPLIES TO	
		MPO*	Land Exchange**
Dam Safety Permit; ARS 45-1203	stormwater mgmt. facilities	U	U
Arizona Native Plant Law; ARS 03-903	Arizona native plants	U	U
Graham County Lighting Ordinance	outdoor lighting	U	U
Graham County Flood Damage Prevention Ordinance	floodplain protection	U	U
Graham County Septic Permit	septic/waste disposal	U	U

* Mining on Public Lands; **w/Mining on Private Lands

PDSI must also obtain a Class II air quality control permit from the Arizona Department of Environmental Quality (ADEQ). The State of Arizona issues such permits as part of its federally mandated Clean Air Act Title V program to meet National Ambient Air Quality Standards (NAAQS). A Class II permit is necessary for new and modified sources of air pollutants as defined in the Arizona Administrative Code (A.C.R18-2-302[B]). The permit will also contain requirements relating to emission control equipment or practices, record keeping and reporting procedures. PDSI submitted its Class II Permit application to ADEQ on November 9, 1998; PDSI anticipates resubmitting an updated application in light of the revised MPO by the end of 2002.

ADEQ, which has oversight for groundwater protection in Arizona, has determined that potentially discharging facilities proposed for the Dos Pobres/San Juan Project are subject to environmental review under the state's Aquifer Protection Permit (APP) Program. As part of the APP compliance process, PD must demonstrate that discharging facilities will not cause an exceedance of aquifer water quality standards. In addition to this technical demonstration, PD will be required to monitor groundwater quality during operations and through mine closure. PDSI submitted its APP application on October 2, 1998 (J. Korolsky, PDSI, pers. comm.).

Finally, FLPMA Section 302(a), BLM NEPA procedures, and federal Resource Management Planning regulations (43 CFR 1610) require that the Proposed Action conform with decisions in the applicable RMP(s). BLM has determined that the proposed MPO is in conformance with the applicable decisions in the Safford District RMP, as amended (BLM 1991, 1994b).

Table 1-2. Federal Land Use, Management, or Activity Plans Under Which the Offered Lands Would be Managed If Acquired by the Public

Applicable Management Plan	Offered Lands
Safford District Resource Management Plan (amended)	Musnicki, Freeland, Butler-Borg, Norton
Gila Box Management Plan	Amado, Curtis
Las Cienegas Resource Management Plan	Feulner, Schock, Clyne I, Clyne II, Davison*

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Statement for Management, Tuzigoot National Monument	Tavasci Marsh
San Pedro River Riparian Management Plan	Lehner Ranch*
Lower Gila Resource Area Management Framework Plan	Lincoln Ranch*

* The Davison, Lehner Ranch, and Lincoln Ranch properties were part of the original offered lands package but were not selected for inclusion in the land exchange alternative analyzed in this EIS.

1.5.2 Land Exchange

The land exchange alternative in this EIS conforms with all applicable federal management plans. The selected lands have been identified for disposal in the Safford District RMP, as amended (BLM 1991, 1994b). All of the offered lands have been identified for acquisition in federal management plans. Table 1-2 lists the federal management plans or area-specific plans that would apply to management of the offered properties if acquired through the exchange. More detailed information about these properties and the proposed and foreseeable uses of them based on these management plans is provided in Chapter 2 in Section 2.2.2.1.3.

Before authorizing an exchange, the BLM must comply with NEPA, Federal Land Policy Management Act (FLPMA) of 1976 as amended by the Federal Land Exchange Facilitation Act (FLEFA) of 1988, and other federal regulations, and must coordinate with other federal, state, and local agencies whose responsibilities may include some aspects of the foreseeable uses of the selected lands. Refer to Table 1-1 for a list of the federal and state laws and regulations that apply to a federal land exchange.

1.5.3 Water Rights Authority

As described in Chapter 2 in this EIS, the Dos Pobres/San Juan Project would involve groundwater pumping at the mine site and retention of stormwater runoff. Because both groundwater and surface runoff in the project area are hydrologically connected to the Gila River, decreed waters of that river form part of the context for the analyses presented in this EIS. Water rights concerns in the Gila River basin are highly controversial. The water uses proposed for the Dos Pobres/San Juan Project are subject to additional authority beyond that of the BLM and the COE. This section briefly addresses the legal framework that may bear on the anticipated water uses, impacts, and possible mitigation measures associated with the Project. However, we must emphasize that an EIS is fundamentally a scientific and technical document, based on facts and data and reasonable extrapolations from such facts and data. It is not a legal document and does not purport to claim or otherwise state any legal position by any of the federal agencies involved in its preparation.

Accordingly, what is set forth in this section and in all other sections of this EIS that may implicate legal issues will be stated in the most general and neutral terms, the aim of which is to inform the reader about the overall and complex legal context in which the environmental issues must be analyzed and evaluated. The purely legal issues that will affect the Project, which include several pending lawsuits in state and federal court, must be considered in a forum separate from this EIS.

1.5.3.1 Gila River Water Issues

The Gila River is a perennial stream which becomes intermittent due to agricultural diversions during periods of low flow. The Dos Pobres/San Juan Project proposes to pump groundwater for mining purposes from a well field located approximately seven miles north of the Gila River. The available scientific evidence indicates that the cumulative effect of proposed pumping, stormwater management activities, and evaporation from the anticipated pit lakes would eventually reduce existing flows in the Gila River by an unmeasurable volume each year in perpetuity (details of the groundwater model results are provided in Sections 4.3.2.5.1 and 4.3.2.6.1). Project development is predicted to result in a reduction of the overall volume of water that would otherwise

reach the Gila River and become “appropriable” water (i.e., subject to appropriation and beneficial use). Under Arizona’s state water rights law, water rights pertain only to appropriable water.

Phelps Dodge has proposed mitigation measures (see Appendix F) to compensate for potential impacts to surface flows and/or senior appropriators in the Gila River. The proposed mitigation is to fallow farmlands with decreed water rights owned by PD on an alternate year schedule, thus decreasing consumptive use in the Gila River system by an amount no less than the predicted depletion in surface flows anticipated to occur as a result of development of the Dos Pobres/San Juan Project. (See Section 4.9 for a full description of the Alternate Year Fallowing Program, which provides for mitigation that is more than three times the current predicted impact.) The amount of land which must be fallowed to offset predicted surface flow impacts, and the duration of the mitigation, are tied to the Model, Monitor, and Mitigate Program (3M Program, see Section 3 of Appendix F). This program anticipates that alternate year fallowing would occur in perpetuity.

The Decree entered June 29, 1935, in the case entitled United States v. The Gila Valley Irrigation District, et al., Globe Equity No. 59, (D. Arizona 1935) (unreported), commonly called the Globe Equity No. 59 Decree, established the rights of the United States and other claimants to use water from the Gila River. Except for certain entities identified in the Globe Equity No. 59 Decree, the rights to use water from the Gila River were authorized for decreed lands solely for irrigation purposes. Among the beneficial owners of the rights decreed to the United States were the San Carlos Apache Tribe and the Gila River Indian Community. Although PD was not decreed rights to use water from the Gila River under the Globe Equity No. 59 Decree, PD has since purchased farmlands in the Safford Valley with decreed rights to waters of the Gila River.

Article XIII of the Globe Equity No. 59 Decree prohibits all parties holding decreed rights from "...diverting, taking, or interfering in any way with the waters of the Gila River or any part thereof, so as in any manner to prevent or interfere with the diversion, use, or enjoyment of said waters by the owners of prior or superior rights therein as defined and established by this Decree...." The Gila Water Commissioner, an appointee of the U.S. District Court, administers and enforces the Globe Equity No. 59 Decree.

In the State of Arizona, pumping groundwater on private lands outside of an Active Management Area (AMA; the Gila River basin is not an AMA) only requires filing a Notice of Intent to Drill a Well with the Arizona Department of Water Resources (ADWR). The source and amount of groundwater pumped are not regulated. A lawsuit filed in U.S. District Court, United States, et al. V. Gila Valley Irrigation District, No. Globe Equity No. 59 (JCC), challenges whether certain wells in the upper Gila River basin are pumping waters of the Gila River (i.e., pumping appropriable subflows of the river) and whether such pumping is allowed under the Globe Equity No. 59 Decree. The court has stayed further action on this suit pending resolution of other water resources issues by state courts. A general stream adjudication of the entire Gila River system and source, In re the General Adjudication of All Rights to Use Water in the Gila River System and Source, Maricopa County Nos. W-1 through W-4, ("the Gila River Adjudication") is pending in state court. Within this general adjudication is a concurrent Contested Case, In Re: Subflow Technical Report, San Pedro Watershed, in which the subflow issue as to state law will be decided, based on establishing the existence and boundaries of the saturated floodplain of the Holocene alluvium over which the San Pedro River flows. A decision in that Contested Case, now pending, may affect the related proceeding in the Globe Equity No. 59 case.

During public scoping for this EIS, concerns were raised as to whether the Project's proposed groundwater pumping and alternate year fallowing program were permissible under the Globe Equity No. 59 Decree and Gila River general stream adjudication. Because of those concerns and the ongoing adjudication and litigation related to Gila River water rights, BLM included a discussion in the DEIS (i.e., in this section) of the regulatory authorities pertinent to these issues. During public review of the DEIS, BLM received numerous comments that either disagreed with some of the statements made or provided additional information for BLM's

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consideration. Two interpretations of the legal framework surrounding surface water and groundwater use in the Safford Valley were represented in these comments.

The first interpretation is that PD is prohibited by the Globe Equity No. 59 Decree from reducing surface flows in the Gila River (i.e., using "waters of the Gila River") by pumping groundwater and by retaining stormwater on-site, some of which would otherwise flow into the Gila River. Also according to this interpretation, PD's plans to mitigate for the predicted surface water impact by fallowing decreed lands on alternate years to reduce consumptive river water use would be a change in point of diversion and change in use from agriculture to mining, since the mitigation is for mining impacts. Furthermore, this interpretation posits that to do this under the Globe Equity No. 59 Decree, PD must seek authorization 1) from the Gila Water Commissioner to change the use and point of diversion and to pump groundwater; and 2) from U.S. District Court to pump groundwater if the Gila Water Commissioner does not authorize groundwater pumping. According to this interpretation, until these authorizations are secured, neither the BLM nor the COE can issue their respective decisions regarding this proposed Project.

According to the second interpretation, groundwater pumping by PD on their privately owned, non-decreed lands seven miles north of the Gila River is legal in the State of Arizona and is not subject to the Globe Equity No. 59 Decree, nor does it require permission by the Gila Water Commissioner, U.S. District Court, BLM, COE, EPA, San Carlos Irrigation District, ADWR (which only requires notification of the intent to drill a well), or any other entity. Under this interpretation, water in tributaries to the Gila River is also not subject to the Globe Equity No. 59 Decree; therefore, retention of stormwater on the mine site does not interfere with rights to water of the Gila River. Furthermore, while mining-related activities are expected to result in a reduction of Gila River surface flows by some small, but unmeasurable, amount each year, those activities would not interfere in any unlawful manner with the rights of senior appropriators. PD has elected to mitigate for the modeled impact on Gila River flows by reducing consumptive agricultural water use on its decreed agricultural lands by leaving some fields fallow on an alternate year schedule. This interpretation further posits that the proposed fallowing involves no change in use (river water is still being used for agricultural irrigation on farmed portions of the decreed fields) nor change in point of diversion (the location of the diversion remains the same); therefore, (a) no authorization for this proposed mitigation is required under the Globe Equity No. 59 Decree, (b) none of the proposed pumping, retention, or fallowing activities proposed for the Project requires authorizations from the Gila Water Commissioner or U.S. District Court, and (c) a decision by BLM, or COE, to approve the proposed Project would not cause a violation of the Globe Equity No. 59 Decree. Until the U.S. District Court decides United States, et al. v. Gila Valley Irrigation District, No. Globe Equity No. 59 (JCC), regarding whether certain wells in the Gila Valley are pumping waters of the Gila River, it may not violate current state water law to pump groundwater in the Safford Valley depending on the location of the wells. Moreover, it is uncertain whether groundwater wells located seven miles distant from the Gila River would be considered by the court to be pumping subflow, or appropriable waters, of the Gila River.

In a DEIS comment letter, BLM received information from the Gila Water Commissioner giving his opinion as to his authority with regard to the proposed pumping and stormwater diversions. The Commissioner wrote that "it has been the historical position of the Office of the Gila Water Commissioner that before the powers of enforcement granted to the Gila Water Commissioner under Article XII can be exercised, it must be established that waters of the Gila River are being interfered with by someone holding a decreed water right under Article V of the Decree" (comment letter to BLM from D. Weesner, GWC, December 14, 1998). According to the Commissioner, he "does not ... have any jurisdiction over the pumping planned by Phelps Dodge in connection with its proposed mining project ... [and] furthermore, he does not believe he can take any action to restrict or regulate the use of surface waters that might flow in the Gila River, at least until the United States District Court has issued its order for him to do so" (ibid.).

Regardless of pending water rights litigation, BLM has determined that it has authority to issue a ROD relating to proposed mining uses of public lands. Entities who wish to address water rights issues may do so in other forums; for example, the Globe Equity No. 59 Decree proceedings or the Gila River Adjudication. Given the complex legal framework surrounding the Project's use of surface water and groundwater resources, it is important to note that the respective decisions by BLM and COE in this NEPA environmental process do not constitute approvals or denials with respect to rights to the use of water resources. PD is aware of and has assumed the risk that its proposed water uses for the Dos Pobres/San Juan Project may result in PD's being drawn into water rights litigation, perhaps even by the United States.

1.5.3.2 Groundwater Issues

The available scientific evidence indicates that the proposed groundwater pumping activities may result in two effects on groundwater on the San Carlos Apache Reservation. First, there is a projected increase in the flow of deep regional groundwater away from portions of the Reservation southward towards the mining area (an existing condition that would be increased by an unmeasurable amount). Second, some lowering of the groundwater table may occur near the Reservation boundary, although the decrease is predicted to be nearly zero (see Sections 4.3.2.5.1).

After the DEIS was issued in 1998, two major developments occurred with respect to groundwater which have the potential to impact the Dos Pobres/San Juan Project. The first major development was the execution of the San Carlos Apache Tribe Water Rights Settlement Agreement ("Settlement Agreement") on March 30, 1999. This Settlement Agreement was executed by the Secretary of the Interior, the San Carlos Apache Tribe, and others. PD is not a party to the Settlement Agreement and is not bound by it. BLM, on the other hand, acts as an agent of the Secretary of the Interior and is bound by the Settlement Agreement. The Settlement Agreement states that:

The Tribe and the United States acting on behalf of the Tribe shall have the permanent right to the on-Reservation diversion, use, and storage of all Groundwater beneath the Reservation, subject to the Groundwater Management Plan referred to in Section 3710(d) of the Act.

The Groundwater Management Plan referred to in the Settlement Agreement has not yet been drafted.

The second major development with respect to groundwater was a November 19, 1999, decision by the Arizona Supreme Court arising out of the Gila River general stream adjudication. The court held that:

Federal reserved rights extend to groundwater to the extent groundwater is necessary to accomplish the purpose of a reservation.

* * *

A reserved right to groundwater may only be found where other waters are inadequate to accomplish the purpose of a reservation. To determine the purpose of a reservation and to determine the waters necessary to accomplish that purpose are inevitably fact-intensive inquiries that must be made on a reservation-by-reservation basis.

It is unknown at this time what the Gila River Adjudication court's determination will be with respect to a reserved right to groundwater for the San Carlos Apache Tribe. PD is aware that any such ruling may impact its ability to pump groundwater.

1.6 ISSUES RAISED DURING SCOPING

1.6.1 Scoping Process and Efforts

The BLM conducted two public scoping efforts for the Project. An initial scoping period (“Scoping I”) was held in late fall of 1994 when the Proposed Action was solely a land exchange, and a second scoping effort (“Scoping II”) was held in October 1996 after PD submitted an MPO (refer to Chapter 5, Coordination and Consultation, for a detailed description of the BLM’s public and agency scoping efforts). In Scoping I, a total of 133 letters were received, in which 383 comments were identified and categorized. During Scoping II, a total of 77 letters were received, in which 233 comments were identified and categorized. Letters were received from private citizens and businesses; federal, state, and local agencies; Indian tribes or their representatives; non-governmental organizations and special-interest groups; and elected officials.

1.6.2 Summary of Scoping Issues

For the purpose of determining the scope of analysis for this EIS all issues raised during scoping were grouped into major categories and subcategories as listed in Table 1-3. To ease tracking of issues in this EIS, Chapter 3 and the majority of Chapter 4 in this document are organized according to this categorization of issues.

Table 1-4 summarizes the issues and comments that BLM determined are within the scope and analyzed in this EIS and assists the reader in tracking the analysis of issues through this EIS. Other sources for tracking issues include the Table of Contents and the Index. Whenever possible, comments listed in Table 1-4 were rephrased into neutral questions, but some are direct quotes from commentors. Section 1.6.2.2 lists the scoping issues that the ID Team has determined to be beyond the scope of analysis for this EIS and will not be considered further. Section 1.6.2.3 responds to other scoping issues or comments that are essentially requests for more information; these are also issues that will not be analyzed in this EIS.

1.6.2.1 Issues Beyond the Scope of this EIS

The ID Team determined that the following comments/issues are beyond the scope of analysis for this EIS; these issues will not be further analyzed in this document.

Table 1-3. Summary of Scoping Issues Organized by Major Categories and Subcategories

LAND USE

Public Lands Management
Access/Recreation
Encumbrances
Agriculture/Grazing
Mineral Rights
Surface Water Rights
Noise/Vibration
Visual Resources
Hazardous Materials
Foreseeable Uses

PHYSICAL RESOURCES

Climate
Air Quality
Geology
Soils
Groundwater
Surface Water (including Waters
of the U.S.)

BIOLOGICAL RESOURCES

Vegetation
Wildlife
Special Interest Species
Biodiversity

CULTURAL RESOURCES

Archaeological Resources
Traditional Cultural Properties

SOCIOECONOMIC RESOURCES

Population/Demographics
Local/Regional Economy
Infrastructure
Transportation
Quality of Life

INDIAN TRUST RESOURCES

Indian Trust Assets

REALTY PROCESS

Public Interest
Appraisal Methods

REGULATORY/PERMITTING

Environmental Protection Laws
Operations Management
Mining Plan of Operations

CONSULTATION AND COORDINATION

NEPA Procedural Compliance
Environmental Justice

Chapter 1

1.6.2.1.1 Socioeconomic Resources

- < The effects of the Project on the nation's trade imbalance and importation of copper
- < The effects of the Project on the American standard of living

1.6.2.1.2 Regulatory/Permitting

- < The relative environmental impacts of mining copper in the U.S. or abroad based on domestic vs. foreign environmental standards and regulations
- < Whether the "Preferred Alternative [interpreted to mean the MPO] maximizes PD's efficiency and productivity"

1.6.2.2 Issues Addressed but Not Tracked in this EIS

The following section presents issues and comments (in italics) that the ID Team determined to be pertinent to the EIS but will not be tracked through the EIS. In general, these comments are mainly requests for information or questions about the NEPA or realty processes, and BLM determined that these comments warranted responses rather than analysis within this EIS. The ID Team's responses to these comments are organized by the major resource categories and subcategories as presented in Table 1-3.

1.6.2.2.1 Land Use

Why doesn't the BLM buy the offered lands using the Land and Water Conservation Fund?

This alternative method of acquiring the offered lands has not been pursued for the following reasons: 1) the offered lands have not been offered for sale, only for exchange; 2) BLM policy, as expressed in Instruction Memorandum No. 96-04 (BLM 1995a) and in the Safford District RMP, as amended, reaffirms previous BLM policy statements that identify land exchanges as the agency's preferred method of disposing of unwanted federal lands and acquiring desirable private lands; 3) purchasing the offered lands using the Land and Water Conservation Fund (LWCF) (assuming the lands were available for sale) would require the BLM to embark on a lengthy, uncertain, and competitive process to acquire the necessary funds; and 4) even if BLM's proposal to acquire these lands was selected in the national selection process, Congress could decide not to authorize the needed funds. For these reasons, BLM cannot and is not pursuing use of Land and Water Conservation Funds as a means to acquire the offered lands.

The San Carlos Apache Tribe disputes the southern boundary of its current reservation and claims that some lands proposed for exchange rightfully belong to the Tribe.

This comment reflects a longstanding issue between the San Carlos Apache Tribe (Tribe) and the federal government. The area of concern to the Tribe consists of about 40,000 acres of public and private land south of the current San Carlos Apache Reservation boundary in the vicinity of Lone Star Mountain eastwards toward Bonita Creek. This area includes a portion of selected lands as well as two of the offered properties currently proposed for exchange with PDSI in the Land Exchange Alternative, as described in Chapter 2, Section 2.2.2.1.1. The Tribe also raised this issue in 1991 in protest of the Safford District Resource Management Plan; in 1994 during scoping for the Morenci and Safford Land Exchange EISs; and to the Assistant Secretary for Indian Affairs in December 1994.

Table 1-4. Scoping Issues Analyzed for the Proposed Dos Pobres/San Juan Project and Sections in this EIS Where Each Issue Is Addressed

MAJOR CATEGORY	SUBCATEGORY	COMMENT	DISCUSSED IN SECTIONS
Land Use	Public Lands Management	C What are the impacts to federal management of public lands?	3.2.1.1; 4.3.1.1; 4.4.1.1
		C Would the proposed exchange result in isolating state land and/or non-PD private tracts?	3.2.1.1.1; 4.3.1.2; 4.4.1.2
		C What are the impacts of the exchange on designated special management areas (i.e., Wilderness, Wild & Scenic Rivers, ACECs, NCAs)?	3.2.1.1.2; 4.3.1.1; 4.4.1.1
		C What are the impacts from loss of BLM authority over mining activities if the lands are exchanged?	1.6.2.2.4; 3.2.1.1; 4.4.1.1
	Access/Recreation	C Would surface water rights be exchanged?	2.2.2; 3.2.1.6; 4.4.1.6.1
		C How would public access and recreation use (hunting, rockhounding, hikers, outfitters, etc.) of public lands be affected?	3.2.1.2; 4.3.1.2; 4.4.1.2
		C How would public access on San Juan Mine Road to the Gila Mountains and to the Melody Claims be impacted?	3.2.1.2; 4.3.1.2; 4.4.1.2
		C What are the impacts of the Project on the historic Safford-Morenci Trail?	3.2.1.2.2; 4.4.1.2
	Agriculture/Grazing	C What are the impacts to prime/unique farmlands?	3.2.1.4; 4.3.1.4; 4.4.1.4
		C What are the impacts to cattle grazing and allottees?	3.2.1.4; 4.3.1.4; 4.4.1.4
	Encumbrances	C What are the impacts to existing rights-of-ways and easements, including the telephone easements on the Musnicki property?	3.2.1.3; 3.3.1.2.1; 4.3.1.3; 4.4.1.3
	Mineral Rights	C What are the impacts to the state's mineral estate in Section 32, T5S, R27E?	3.2.1.5; 4.3.1.5; 4.4.1.5
		C What are the impacts to third-party mining claims (i.e., Melody Claims)?	3.2.1.5; 4.3.1.5; 4.4.1.5
		C Would mineral rights of the selected and offered lands also be exchanged?	2.2.2; 3.2.1.5; 4.3.1.5; 4.4.1.5
	Surface Water Rights	C Would surface water rights be exchanged?	2.2.2; 3.2.1.6; 4.3.1.6; 4.4.1.6
	Noise/Vibration	C What are the impacts from blasting on the Mount Graham observatories?	3.2.1.7; 4.3.1.7; 4.4.1.7
	Visual Resources	C Will the Project affect nighttime visibility for the Mt. Graham observatories?	3.2.1.8.5; 4.3.1.8; 4.4.1.8
		C Will the Project affect the visual quality of the Gila Mountains?	3.2.1.8; 4.3.1.8; 4.4.1.8

Table 1-4 (continued). Scoping Issues Analyzed for the Proposed Dos Pobres/San Juan Project and Sections in this EIS Where Each Issue Is Addressed

MAJOR CATEGORY	SUBCATEGORY	COMMENT	DISCUSSED IN SECTIONS	
Physical Resources	Hazardous Materials	C Would the Project affect hazardous materials?	3.2.1.9; 4.3.1.9; 4.4.1.9	
	Climate	C What are the impacts to microclimate?	3.2.2.1; 4.3.2.1; 4.4.2.1	
	Air Quality	C What are the impacts to air quality to the region and to the San Carlos Apache Reservation from emissions from criteria pollutants, including acids using in leaching?	3.2.2.2; 4.3.2.2; 4.4.2.2	
		C Would any Class I airsheds within 100 km of the Project be impacted?	3.2.2.2.2; 4.3.2.2; 4.4.2.2	
		C Does the Project conform with the State Implementation Plan?	4.3.2.2; 4.4.2.2	
		C What is the mineral potential of the selected lands?	3.2.2.3.2.	
	Geology	C What are the impacts on soils?	3.2.2.4; 4.3.2.4; 4.4.1.4	
	Soils	C What are the impacts to groundwater quality?	3.2.2.5; 3.2.2.5.1; 4.3.2.5.2; 4.4.2.5.2	
	Groundwater	C What are the impacts to groundwater quantity?	3.2.2.5.1; 4.3.2.5.1; 4.4.2.5.1	
		Surface Water	C How would the Project affect water quality of the Gila River?	Table 4-40; 4.3.2.6.2
			C Would the Project affect water quantity of the Gila River?	3.2.2.6; 4.3.2.6.1
			C How would erosion potential and sedimentation be impacted?	4.3.2.4; 4.4.2.4
			C How would drainage patterns be impacted?	2.1.2.3.2; 3.2.2.6.4; 4.3.2.6.1; 4.3.2.6.4; 4.3.2.6.5
		C How will the Project affect floodplains (100-year frequency floods)?	3.2.2.6.4; 4.3.2.6.4	
C Will the mine pits fill with water, and if so, what would the water quality of these lakes be?		3.2.2.6.3; 4.3.2.6.3		
C What are the impacts to "waters of the U.S." (including streams and washes)?		3.2.2.6.5; 4.3.2.6.5		
Vegetation		C What are the impacts of the Project on riparian areas?	3.2.2.6.5; 3.2.3.1.2; 4.3.2.6.5; 4.3.3.1; 4.4.3.1	
		C Will the Project impact wetlands?	3.2.2.6.5; 3.2.3.1.2; 4.3.2.6.5; 4.3.3.1; 4.4.3.1	
Wildlife	C What are the impacts of the Project on wildlife and wildlife habitats?	3.2.3.1; 3.2.3.2; 4.3.3.1; 4.3.3.2; 4.4.3.2		
	C What are the impacts to wildlife (i.e., migratory birds, bats) from potential exposure to solution ponds/process waters?	4.3.3.2; 4.3.3.3		
	C Will the Project impact big-game species?	3.2.3.2.1; 4.3.3.2; 4.4.3.2		

Table 1-4 (continued). Scoping Issues Analyzed for the Proposed Dos Pobres/San Juan Project and Sections in this EIS Where Each Issue Is Addressed

MAJOR CATEGORY	SUBCATEGORY	COMMENT	DISCUSSED IN SECTIONS
Cultural Resources	Special Status Species	C Would special interest species be impacted by the proposed Project?	3.2.3.3; 4.3.3.3; 4.4.3.3
		C Will the Project impact state-protected plant species?	3.2.3.3.1; 4.3.3.3; 4.4.3.3
	Biodiversity	C Will the Project adversely affect biodiversity in the region?	3.2.3.4; 4.3.3.4; 4.4.3.4
	Archaeological Resources	C What are the impacts to historic and prehistoric resources?	3.2.4.1; 4.3.4.1; 4.4.4.1
		C What are the cultural resources and their cultural affiliations on the selected lands?	3.2.4; 4.3.4.1; 4.4.4.1
Traditional Cultural Properties	C What are the impacts to traditional cultural properties?	3.2.4.2; 4.3.4.2; 4.4.4.2	
Socioeconomic Resources	Population/ Demographics	C What are the impacts to the local population and demographics?	3.2.5.1; 4.3.5.1; 4.4.5.1
		C What are the impacts of the Project on minority populations and/or low income groups?	3.2.5.1.1; 5.2
	Economy	C What are the impacts to the local and regional economy?	3.2.5.2; 4.3.5.2; 4.4.5.2
		C What are the impacts to Graham County's direct and indirect employment?	3.2.5.2.1; 4.3.5.2.1; 4.4.5.2.1
		C Will the Project impact nearby Indian communities? If so, how?	3.2.5.1.1; 4.3.5.2; 4.3.5.3; 4.3.6
	Infrastructure	C How would the Project affect the local (county), state, and federal tax bases?	3.2.5.2.3; 4.3.5.2.3; 4.4.5.2.3
		C How would the Project affect Graham County infrastructure (schools, medical facilities, utilities, etc.)?	3.2.5.3; 4.3.5.3; 4.4.5.3
		C How would the Project affect local transportation and traffic?	2.1.2.3.5; 2.1.2.3.6; 3.2.5.4; 4.3.5.4; 4.4.5.4
Indian Trust Resources	Indian Trust Assets	C What are the impacts to Indian trust assets, including perfected and decreed water rights held by tribes from water use for mining?	3.2.6; 3.2.2.6; 4.3.6; 4.4.6; 4.3.2.6.1
Consultation and Coordination	Environmental Justice	C What efforts are being made to comply with environmental justice (vis-a-vis minorities, low-income, tribes)?	5.2

Chapter 1

About a year after creation of the San Carlos Apache Reservation in 1872, subsequent Executive Orders in 1873 and 1874 shifted the southern and eastern boundaries of the reservation, thereby returning some of the former reservation land to the public domain. In 1883, the General Land Office (GLO) issued Special Instructions to surveyor Paul Riecker to survey the new southern and eastern boundaries of the reservation. This survey established the current San Carlos Apache Reservation's southern boundary location as depicted in Figure 1-1. In response to the San Carlos Apache Tribe's concerns, the location of the Reservation boundary was reviewed in 1919 and in 1936 by the federal government. In 1919, the boundary location was reviewed by the Commissioner of the GLO and approved by the First Assistant Secretary of the Department of the Interior; in 1936, the location was again reviewed by the Office of the Solicitor and approved by the Acting Secretary of the Department of the Interior. Both reviews upheld the current boundary location as defined by the Riecker survey, which included, but were not limited to, lands covered in the Executive Orders of 1873 and 1874. The Commission awarded the San Carlos and White Mountain Apache tribes a final settlement of \$4,900,000 in 1972 as fair compensation for all aboriginal lands that previously had been taken from the tribes without compensation, including all lands within the disputed area. Both the San Carlos and White Mountain Apache tribes agreed to accept this settlement by means of resolutions passed unanimously by both tribal councils.

The Indian Claims Commission was set up in 1946 by Congress to address longstanding land and treaty grievances of various tribes. In June 1969, the Commission found that the San Carlos and White Mountain Apache tribes were entitled to recover the "fair market value of their aboriginal title lands," which included, but were not limited to, lands covered in the Executive Orders of 1873 and 1874. The Commission awarded the San Carlos and White Mountain Apache tribes a final settlement of \$4,900,000 in 1972 as fair compensation for all aboriginal lands that previously had been taken from the tribes with out compensation, including all lands within the disputed area. Both the San Carlos and White Mountain Apache tribes agreed to accept this settlement by means of resolutions passed unanimously by both tribal councils.

When the San Carlos Apache Tribe raised the boundary dispute again in 1991 in its protest of the Safford District RMP, BLM acknowledged "the concern on the part of the San Carlos Apache Tribe over the land ownership in the Bonita Creek and mineral strip areas" (BLM's Partial Record of Decision, 1992, p.14). However, in correspondence with then-Acting Tribal Chairman Raleigh Thompson, then-Arizona BLM State Director Lester Rosenkrance stated that after three separate governmental reviews of documentation pertinent to this issue (in 1919, 1936, and 1992), "we [BLM] must agree that the position of the southerly boundary of the San Carlos Indian Reservation, as identified by the monuments on the ground and surveys on file, as determined by the General Land Office and affirmed by the Secretary of the Interior, does reflect the true location of the boundary" (Rosenkrance to Raleigh Thompson, 1992, p. 4). By this, BLM meant that, in its judgment, the existing boundary conforms to the original survey instructions issued by the General Land Office on May 19, 1883.

It is BLM's current position that this issue has been repeatedly reviewed and addressed adequately by BLM and other federal entities; that the Tribe accepted fair compensation for all disputed aboriginal lands; and that no new information concerning the southern boundary of the reservation has been provided by the Tribe or the Bureau of Indian Affairs that warrants yet another review of the issue. Therefore, this issue will not be carried forth for further consideration in this EIS.

What are the foreseeable uses of the Lone Star area?

Section 2.2.2.1.2 in Chapter 2 describes the foreseeable uses of the selected lands, including the Lone Star area, as identified by PDSI.

What are the foreseeable uses of the offered lands with regard to development, grazing, and mineral entry?
Please refer to Chapter 2, Section 2.2.2.1.3 for a description of the foreseeable uses of the offered lands with regard to these land uses.

1.6.2.2.2 Socioeconomic Resources

Will the Project affect Safford's customs, culture, and small-town lifestyle?

This question is a quality-of-life issue of a highly subjective nature. The ID Team has determined that this issue should be addressed more directly through analysis of impacts to specific socioeconomic resources of the community that may contribute to an individual's quality of life in Safford. These resources include population and demographics, employment, taxes, traffic, housing, and infrastructure, all of which are addressed in this document. Individual readers can then determine whether the quality of life in Safford, as influenced by these community resources, will be impacted by the Project.

1.6.2.2.3 Realty Process

Will the mineral potential value of the selected lands be considered in the appraisals?

Yes. The mineral values of the selected lands are listed in Chapter 3 and are but one of the many variables considered in the land appraisals. The mineral values are derived from a BLM-approved mineral potential evaluation completed by a third-party contractor. It should be noted that all of the economic orebody for the Dos Pobres mine and some for the San Juan mine are located on private lands already owned by PD.

Is the exchange fair in terms of resource values and acreage?

There are numerous federal regulations that the BLM must follow in considering a land exchange alternative to ensure that it is fair in terms of dollar values and in the public's interest (see Table 1-1). On the basis of the data and analyses presented in this EIS, the authorizing officer at the BLM will decide whether the public interest would be served by the exchange alternative(s) and the BLM's Record of Decision will reflect this consideration.

Are land exchanges with such acreage disparities common?

Yes, disparities in acreages are more common than not for federal land exchanges. The regulations governing federal land exchanges require that, among other things, the selected and offered lands be of equal monetary value. It is rare that any two parcels of land of equal acreage but with different resources and/or different locations would be appraised at the same dollar value. For this Project, the acreage ratio of selected lands to offered lands is about 4.4 to 1. Given that the selected lands are located in a rural area and adjacent to private lands owned by PD, and that some of the offered lands, such as Tavasci Marsh and the properties in the Sonoita Valley Acquisition Planning District, are located in or near areas that are desirable or that have high potential for residential/suburban development, this acreage disparity is not unexpected in order for the monetary values of the selected and offered lands to be equal.

Who will conduct the appraisals?

As individual offered properties as well as the selected lands must be appraised, both contract and BLM staff appraisers completed the appraisals for this project. All appraisers are "Certified General Appraisers" under Arizona law. All of the appraisals were reviewed by an independent BLM review appraiser to ensure adherence to standards and conformance with federal regulations.

Chapter 1

What appraisal methods will be used to calculate the monetary value of the lands?

Appraisals completed by the BLM are regulated by federal laws, including the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1988 and Uniform Relocation Assistance and Real Property Act of 1970; appraisals are conducted under guidelines contained in the Uniform Appraisal Standards for Federal Land Acquisitions (Interagency Land Acquisition Conference 1992). These laws and regulations ensure that standardized procedures are used to determine the monetary values of the selected and offered lands.

In determining the market value of both the selected and offered lands, it is important to note that not all acres are created equal—for instance, an acre in downtown Phoenix does not have the same monetary value as an acre in downtown Safford. Among other variables, the appraisals consider the current and potential uses of the lands; the sales of similar types of land under arms-length circumstances; and the mineral potential of lands in which the mineral estate is being exchanged.

1.6.2.2.4 Regulatory/Permitting

What regulatory requirements (e.g., NEPA) would there be for future mining (i.e., Lone Star) if the land becomes private?

Loss of BLM administration and public ownership of the selected lands through an exchange does not mean loss of federal and/or state jurisdiction over mining or mining-related activities. Regardless of whether possible future mining activities at Lone Star or for sulfide operations at Dos Pobres occur on public or private lands, PDSI must secure a number of federal and state authorizations to implement such mining or mining-related activities. Table 1-1 provides a summary of these authorizations. Furthermore, many of these state-required permits, such as the Clean Air Act Title V air quality permit (ADEQ jurisdiction), the Aquifer Protection Permit (ADEQ jurisdiction), and the Arizona Mined Lands Reclamation requirements (State Mine Inspector's jurisdiction), provide for public notification and review prior to issuance of the permits, as well as review and reauthorization for any proposed major modifications of the mine activities for which a permit has been issued.

For mining activities on private lands in Arizona, the loss of BLM jurisdiction has two implications for the applicability of NEPA: 1) NEPA analysis of an MPO by the BLM would not apply; and 2) state reclamation requirements would replace federal reclamation requirements. Once BLM-administered public lands pass into private ownership, BLM is no longer responsible for authorization of the MPO under 43 CFR 3809 or NEPA analysis of an MPO. However, in order to implement mining on private lands, specific activities in a proponent's mine plan must be authorized by other federal agencies, such as the COE, which would continue to have jurisdiction over aspects of the proposed mining under the Clean Water Act. Some of these permit approvals constitute major federal actions that would also be subject to NEPA analysis. In those instances, a federal agency other than the BLM would conduct NEPA analysis of the proposed mine activities within its jurisdiction even though the land is privately owned. Therefore, it is the loss of BLM authority in particular, and not federal authority in general, that is the consequence of the proposed land exchange.

With regard to the NEPA analysis of any future development of the Lone Star and Dos Pobres sulfide orebodies if the land exchange is approved (i.e., the lands become private), the currently known foreseeable uses, when formally proposed, would be subject to Clean Water Act permitting under the jurisdiction of the COE. With regard to state versus federal reclamation requirements, Table 4-27 provides a comparative summary of the similarities and differences between federal and state requirements.

“BLM should require PD to demonstrate they have practiced sound environmental management while operating the Morenci, Dos Pobres, and Lone Star mines.”

Environmental standards have changed significantly over the 30+ past years. Management practices that were considered acceptable in the past may no longer be adequate or permissible by today's standards. Thus, the decision of whether to authorize PDSI to implement its proposed MPO on public lands will be based on Phelps Dodge's ability to demonstrate to the BLM and its cooperators that they can meet current, applicable environmental standards and will operate the Project in a prudent manner that prevents undue and unnecessary degradation of the land, as required by federal surface management regulations (43 CFR 3809). In addition, PDSI must demonstrate that they have met the environmental permitting standards of the state and other federal agencies, including the ADEQ and COE. Considering the array and extent of environmental permitting and monitoring requirements involved in the permitting of a new mine on public or private lands and PD's long presence in the region, a review of past management practices will not be tracked as an issue in this EIS.

What measures are proposed for compliance monitoring for permits and reclamation? For monitoring the effectiveness of mitigation measures? What measures are proposed for compliance with NPDES and stormwater permit requirements?

Compliance monitoring is required by several laws and/or for the major permits to be issued for this Project: Air Quality Operating Permit; Aquifer Protection Permit; AZPDES permit; solid and hazardous waste laws and regulations, including the Emergency Planning and Community Right-to-Know Act (EPCRA); and Arizona Mined Lands Reclamation Act. Monitoring activities for these permits and reclamation are briefly summarized below. Measures for monitoring the effectiveness of habitat mitigation and surface water quantity mitigation measures are identified in Appendix F.

- < **Air Quality Operating Permit.** ADEQ has the responsibility to require adequate monitoring, record-keeping and reporting for all permitted sources. Where an applicable requirement does not already exist, ADEQ is required to establish the appropriate monitoring, record-keeping, and reporting requirements. The crushers, screens, conveyor transfer points, and ore bins associated with the Crushing/Material Handling System will be subject to federal New Source Performance Standards (NSPS) which require performance testing to ensure compliance with applicable particulate emission standards. Additionally, ADEQ will require, through conditions in the air quality operating permit, that PDSI comply with monitoring, record-keeping, and reporting requirements for various other fugitive and point sources, including sources not subject to NSPS. ADEQ conducts periodic random inspections of permitted facilities to ensure compliance with permit requirements.

- < **Aquifer Protection Permit (APP).** Under the APP Program, ADEQ requires periodic monitoring of wells located down-gradient from potentially discharging facilities. Analytical results of water quality sampling are submitted to ADEQ at a frequency determined by the agency in their permit. Other monitoring results, such as leak detection inspections of process ponds, are also included in the monitoring reports. ADEQ conducts periodic inspections of facilities permitted under the APP Program.

- < **AZPDES (formerly NPDES) Permit.** Facilities with CWA Section 402 (AZPDES) point source permits are required to monitor and report the water quality and volume of surface water discharges from specified outfalls to “Waters of the United States.” These reports are submitted to ADEQ on a monthly basis. Additionally, ADEQ conducts periodic compliance inspections of AZPDES-permitted facilities.

- < **Solid and Hazardous Waste.** PDSI will be required to comply with the federal Resource Conservation and Recovery Act (RCRA) and state laws and regulations regulating solid and hazardous waste. These laws and regulations include requirements for handling, storage,

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transportation, and disposal of hazardous wastes, as well as mandatory record-keeping, reporting, and personnel training requirements. Additionally, EPA and ADEQ conduct periodic hazardous waste compliance inspections of facilities.

- < **Emergency Planning and Community Right-to-Know Act.** PDSI will be subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) which requires, under Section 313, that facilities in certain Standard Industrial Codes (SIC) meeting threshold requirements submit to EPA and the state-designated agency an annual Toxic Chemical Release Inventory (TRI) Reporting Form (Form R). Facilities are required to report annual chemical use, releases and other waste management activities of Section 313 chemicals, provided that certain activity thresholds are met, on the TRI Form R report. Section 313 includes a list of over 650 chemicals and chemical categories.

Other sections of EPCRA require:

- C Notification to the State Emergency Response Commission (SERC) and Local Emergency Planning Committee (LEPC) if a facility has one or more “extremely hazardous substances” present on site in quantities greater than Threshold Planning Quantities (TPQs) established by EPA (Section 302-303);
 - C Immediate notification to the SERC and LEPC of the release of any “extremely hazardous substance” or any hazardous substance under CERCLA in amounts at or above the specified Reportable Quantities that EPA establishes for each substance (Section 304);
 - C Submission to the SERC, LEPC and local fire department a list of Material Data Safety Sheets (MSDSs), or copies of MSDSs, for any OSHA “hazardous chemical” present on site in quantities greater than 10,000 pounds (Section 311);
 - C Submission of other hazardous chemical inventory information (Section 312).
- < **Arizona Mined Lands Reclamation Act.** The Arizona Mined Lands Reclamation Act (AMLRA) provides that the Arizona State Mine Inspector may enter and inspect any mining facility subject to AMLRA. Facilities subject to the AMLRA are also required to submit detailed annual reclamation status reports to the State Mine Inspector.

What measures are proposed in the Project’s pollution and spill prevention plans?

PD must develop, keep on-site, and make available for agency review a stormwater pollution prevention plan as part of its AZPDES permit compliance, as well as a spill prevention control and countermeasure plan as required by 40 CFR Part 112 Oil Pollution Prevention for the storage of petroleum products above a threshold amount. At this time, these measures are being developed as part of Project’s environmental compliance. Pollution and spill prevention measures generally include best-management practices for erosion and sediment control, waste disposal control, and reducing the risk of spills or other accidental exposures of material and substances to stormwater runoff.

What level of reclamation bonding will be required?

A discussion of reclamation bonding is provided in Chapter 2, Section 2.1.2.4.6, Reclamation Costs and Bonding.

What measures are proposed to address mine waste and reclamation?

These measures are described in Chapter 2 in Section 2.1.2.3.4, Waste Management, in Section 2.1.2.3.5, Hazardous Materials Storage, Handling, and Transportation, and in Section 2.1.2.4, Closure and Reclamation Measures.

What is the acid-generating potential of stockpiles and pit walls and what preventative measures are proposed to protect groundwater and surface water from acid-generation?

Acid-base accounting studies conducted on composite samples of development rock indicated that there is very low potential for acid-generation from development rock stockpiles (see Section 2.1.2.1.6 for discussion of acid-base accounting studies) and from pit walls (Water Management Consultants 2002). Please refer to Chapter 2, Sections 2.1.2.3.2 and 2.1.2.3.3 for description of surface water and groundwater protection measures, respectively.

What is the projected water use of the mine?

PDSI projects its water needs at an average of 3,430 gallons per minute (5,533 af/yr) throughout the 16-year life of the Project. For more information, refer to Chapter 2, Section 2.3.1.4.1, Water Demand and Supply.

What would be the water source for the mine?

Groundwater pumped from a volcanic aquifer source has been identified as the Project's water source. For more information, refer to Chapter 2, Section 2.3.1.4.1, Water Demand and Supply.

What is the potential impact to pit lake chemistry from using ammonium nitrate and fuel oil (ANFO) in the blasting process?

No impacts are expected to pit lake chemistry as a result of using ANFO as the amount of the explosive used is calculated to be entirely consumed during the blast (K. Byrne, Southwest Energy, pers. comm.). It is possible that minute amounts of unconsumed ANFO may remain as residue after blasting, but since such residue would eventually be mined out of the pit(s) along with leach ore and development rock, it is expected that there would not be any ANFO left in the pit to affect pit lake chemistry.

1.6.2.2.5 Consultation and Coordination

"BLM and PD are colluding to facilitate an unfair exchange."

There have been no secret meetings or agreements between the BLM and PD for deceitful or fraudulent purposes (i.e., collusion).

CHAPTER 2

ALTERNATIVES CONSIDERED

This chapter presents the alternatives considered for the Dos Pobres/San Juan Project. Alternatives that were considered but not studied in detail are also described. The permitting agencies' preferred alternatives are identified. A summary table comparing environmental impacts of each alternative is provided at the end of this chapter.

For the purposes of this EIS, different agencies have permitting authority over the various alternatives analyzed in the EIS. For example, a land exchange alternative is only relevant to the actions and decisions of the Bureau of Land Management (BLM), the lead agency (refer to Figure 1-3). Action required by the Corps of Engineers (COE) focuses on mining activities described in the proposed Mining Plan of Operations (MPO) and alternatives developed for that action during NEPA and Clean Water Act (CWA) review.

Because the decisions relevant to the decision-making agencies pertain to either mining-related activities or a land exchange, two "sets" of alternatives have been developed and are analyzed in this EIS. This organization is intended to clarify for the reader the respective decisions to be made by the BLM and the COE regarding the proposed Project, in light of each agency's specific land management and/or permitting authority. Each set of alternatives is presented separately. The first set, the Mine Plan Alternatives Set, presents the proposed Mining Plan of Operations (MPO) for the Project and alternative mine plans⁷ developed by Phelps Dodge Safford, Inc. (PDSI). The second set, called the Land Exchange Alternatives Set, presents a land exchange alternative that is based upon PDSI's original land exchange proposal made in 1994 to the BLM and since modified. Each set includes a No Action alternative that pertains to the specific agency decisions available within that set of alternatives. The No Action alternative is required by NEPA to provide a baseline against which impacts from action alternatives can be compared.

The only agency that can act upon the Land Exchange Alternatives Set is the BLM. If BLM selects the land exchange alternative, the result of this decision would be that PDSI would acquire ownership of the BLM-administered public lands identified in the land exchange alternative, including lands proposed for mining in their MPO. Under this scenario, BLM would not authorize or oversee an MPO since BLM has no authority to regulate mining on private lands (see Figure 1-3). If BLM selects the No Land Exchange (no action) alternative under the Land Exchange Alternatives Set, BLM must then select an alternative from the Mine Plan Alternatives Set to fulfill Section 3809 requirements under FLPMA. Regardless of the BLM decision(s), the permit decision of the COE pertains only to activities described in one of the alternatives in the Mine Plan Alternatives Set, including a No Action (no permit) alternative.

As noted above, federal oversight of mining activities does not necessarily require a BLM presence. If BLM selects the land exchange alternative, it would not oversee the proposed mining, but PDSI's mining activities would still be subject to federal oversight through the COE's jurisdiction under Section 404 of the CWA, the Mine Safety and Health Administration (MSHA), and various other federal regulations listed in Table 1-1 in Chapter 1. Arizona Department of Environmental Quality would continue to oversee compliance with the Arizona Aquifer Protection Permit (APP) Program, Section 402 (Arizona Pollutant Discharge Elimination System or AZPDES), and Clean Air Act air quality permit. The only other change in jurisdiction under the land

⁷ The COE, pursuant to 40 CFR § 230, completes an analysis of alternatives to identify the least environmentally damaging practicable alternative.

exchange would be that the State Mine Inspector's Office and not the BLM, would oversee reclamation for mining.

2.1 MINE PLAN ALTERNATIVES SET

In this set, two mine plan alternatives are described: the Proposed Action (also called the Project or Alternative I in Appendix A) and the Partial Backfill of San Juan alternative (Alternative C in Appendix A).

2.1.1 Formulation of Mine Plan Alternatives

The formulation of alternatives to the proposed Mining Plan of Operations has been based upon information provided by PDSI, BLM, COE, and EPA. The processes underlying the identification of MPO alternatives analyzed in this EIS are summarized below.

As part of CWA Section 404 permitting compliance, the COE conducts an analysis of alternatives⁸ to identify practicable alternatives to the project which minimize impacts to waters of the United States. Practicable alternatives are defined as those that are "available and capable of being done, taking into account cost, existing technology, and logistics, in light of project purposes" (40 CFR§ 230.10(a)(2)). The COE's 404(b)(1) alternatives analysis is provided as Appendix A to this EIS.

NEPA requires that all reasonable alternatives be considered. Two MPO alternatives identified in the COE's 404(b)(1) alternatives analysis (including the Proposed Action) as practicable have been carried forth in this EIS under the Mine Plan Alternatives Set (SWCA 1997c). These alternatives, and other reasonable alternatives, such as the land exchange alternative, developed to meet the Project's purpose and need, are further analyzed herein using additional evaluation criteria developed to address the issues raised during scoping (see Table 1-4 in Chapter 1). The two mine plan alternatives, one of which is the Proposed Action, are described in Sections 2.1.2 and 2.1.3.

2.1.2 Proposed Action Alternative

The following description of the Proposed Action, the Dos Pobres/San Juan Project, has been updated based on a revised Mine Plan of Operations submitted by Phelps Dodge to the BLM in August 2001 (PDSI 2001; see Section 1.3 for Project History and Background). To assist the reader in identifying the meaningful changes that have been made since the DEIS, Table 2-1 summarizes the key differences between the MPO described in the DEIS and the current version.

The Dos Pobres/San Juan Project (the Project) is an integrated mining operation that includes the development of two open pit mines, a crushing and material handling system, a common Solution Extraction/Electrowinning (SX/EW) processing facility, and shared infrastructure and support facilities. Figure 2-1 provides a detailed site

plan of the proposed Project. Based upon the current Mining Plan of Operations, the Project will produce approximately 2.9 billion pounds of salable copper over the Project's estimated 16-year mine production life.

⁸ This analysis is referred to as a 404(b)(1) alternatives analysis pursuant to 40 CFR § 230.

Table 2-1. Differences between the Original MPO in the DEIS and the Revised MPO in the FEIS, and Expected Consequences of the Changes

Original MPO in DEIS	Revised MPO in FEIS	Consequences of MPO Revision
<p>The crushing facility consisted of a two-stage crushing system that reduced ROM ore to a 1-inch nominal size. It was located on the northeast corner of the leach pad.</p>	<p>The crushing facility now consists of a three-stage crushing system and an agglomeration system that reduces ROM material to a nominal 0.5-inch minus size, resulting in increased leaching efficiency. It is located at the northern end of the leach pad, south of the Dos Pobres pit.</p>	<p>Increased leaching efficiency (1) decreases the amount of sulfuric acid used, stored, and trucked to the project site; (2) decreases the number and/or size of mixer-tanks and sulfuric acid and process solution storage tanks on-site; (3) decreases the amount of water used by the project; i.e.,</p>
<p>Crushed ore would have been moved by conveyor from the crushing plant to two, 1,000-ton-capacity truck loadout bins. Concentrated sulfuric acid would have been added to the ore stream as it was transferred to the load-out bins to precondition the ore.</p>	<p>Crushed ore will be moved by conveyor from the crushing plant to an agglomeration facility located at the northern edge of the leach pad. The agglomeration drums will tumble the crushed ore with sulfuric acid and water to agglomerate fines to the larger rock particles, thus producing a more homogeneous product with uniformly wetted particles. This results in higher copper extraction and improved solution flow through the leach ore.</p>	<p>groundwater pumped (5,533 af/yr rather than 6,891 af/yr, thus further reducing the estimated potential impact on groundwater supply, Gila River flows, and San Carlos Apache Reservation groundwater, and (4) decreases the volume of PLS circulating through the pad (20,000 gpm rather than 35,000 gpm). Since the excess process solution impoundment and stormwater impoundment have not been correspondingly reduced in size, the capacity to contain process solutions and runoff from storm events is even greater than it was in the original conservative design.</p>
<p>Sulfuric acid consumption rates over the life of the Project were estimated to average about 2,500 tpd (about 312,500 gpd), requiring approximately 94 truck loads of acid per day, on average.</p>	<p>Sulfuric acid consumption rates over the life of the Project are estimated to average about 1,600 tpd (about 200,300 gpd), requiring approximately 70 truck loads of acid per day, on average.</p>	<p>Reduced usage of sulfuric acid reduces the number of acid delivery trucks, which lowers the risk of spills and contamination both on-site and en route.</p>
<p>Preconditioned crushed ore would have been loaded onto haul trucks for transport to, and placement on, the leach pad.</p>	<p>Agglomerated crushed ore will be delivered to the leach pad by overland conveyor and placed onto the pad by a stacker system.</p>	<p>Use of conveyor rather than trucks for transfer of crushed ore to the leach pad reduces fugitive dust, vehicle emissions, fuel usage, and nighttime lighting, but increases use of electricity (however, the proposed electrical supply is still sufficient).</p>

Table 2-1, continued. Differences between the Original MPO in the DEIS and the Revised MPO in the FEIS, and Expected Consequences of the Changes

Original MPO in DEIS	Revised MPO in FEIS	Consequences of MPO Revision
Water demand over the 16-yr Project ranged from 2,059 to 8,041 af/year and averaged 6,895 af/yr of groundwater pumping.	Water demand over the 16-yr Project averages 5,533 af/yr, a nearly 20% reduction. Range is from 2,048 to 6,604 af/yr.	Reduced groundwater pumping reduces overall predicted long-term surface flow and groundwater impacts.
On-site storage tanks included one, 1-million-gal PLS tank; 16 mixer-settler tanks in the SX plant; two, 1-million-gal raffinate tanks; and one, 1-million-gal runoff collection tank in the tankfarm. Concentrated sulfuric acid was stored in one, 335,000-gal tank at the SX/EW plant, and in two, 1,330,000-gal tanks near the crushing plant.	The PLS tank has been eliminated. Storage tanks now include 6 mixer-settler tanks in the SX plant; one, 426,000-gal raffinate tank; and one, 1.9-million-gal runoff collection tank in the tankfarm. Concentrated sulfuric acid will now be stored in one, 10,000-gal tank at the SX/EW plant, and in two, 312,500-gal tanks near the crushing plant.	The reduction in the number and size of processing and storage tanks decreases the size of the combined footprint of the SX/EW plant and tankfarm.
Two raffinate booster stations were planned, the second during later years of leaching operations.	One raffinate booster station may be required during later years of leaching operations.	This design change would slightly reduce the area of surface disturbance.
The mine fuel station was located between the Dos Pobres and San Juan pits.	The mine fuel station will be located south of the Dos Pobres Mine, northwest of the crusher facility.	No effect; however, other operating changes (conveyor/stacking system) will reduce fuel usage and deliveries.
Maximum height of lifts on the leach pad was 25 feet; maximum height of the pad as a whole was approximately 450 feet.	Maximum height of lifts on the leach pad will be 40 feet, but maximum height of the pad as a whole will remain approximately 450 feet.	No effect.
20% of the top surfaces of the leach pad and development rock stockpiles was to be revegetated in discrete patches (microsites). Microsites were to be capped with 12 inches of Basin Fill sediment or comparable growth media and seeded with native species.	100% of the top surface of the leach pad and development rock stockpiles will be capped with 12 inches of Basin Fill sediment or comparable growth media and revegetated (seeded) with native species.	Revegetation of the entire top surface of the leach pad and development rock stockpiles will occur sooner than if only 20% of the top surfaces were covered by revegetated microsites.

Project production will include the mining of approximately 626 million tons of oxide and sulfide leach ore and 385 million tons of lower grade and unmineralized material referred to herein as development rock. Total minable material amounts to approximately 1.01 billion tons resulting in a 0.6:1.0 non-ore to ore ratio.

Construction of the SX/EW plant, crushing and material handling system, and associated support facilities will require approximately 15 months to complete and will start after completion of the Project's environmental permitting requirements. The Project will involve PD private lands and BLM-administered lands. Table 2-2

lists the approximate surface area⁹ (in acres) disturbance by facility type and property ownership for the Project at completion of mining.

Table 2-2. Approximate Surface Area Disturbance by Facility Type and Property Status for the Dos Pobres/San Juan Project at Completion of Mining

Facility Description	Property Status (acres)		
	PDSI	BLM	TOTAL
Open Pits			
Dos Pobres*	308	0	308
San Juan*	179	162	341
Stockpiles			
Leach Pad	111	811	922
West Development Rock Stockpile	368	365	733
East Development Rock Stockpile	0	101	101
Other Facilities			
SX/EW Facility	0	26	26
Stormwater Impoundment	0	30	30
PLS Collection	0	12	12
Crush/Conveyor System and Acid Unloading	17	8	25
Stormwater Diversions*	20	10	30
Retention/Detention Dams	8	2	10
Dos Pobres Site No. 1*	35	0	35
Dos Pobres Site No. 2*	50	0	50
Truck Shop Service Complex	0	20	20
Compactible Soil Borrow Source and Overburden Stockpiles	74	0	74
New Roads (Access and Haul)**	112	188	300
Soil Stockpiles	91	32	123
Aggregate Borrow Sources	49	89	138
Utilities/Communications	7	3	10
Temporary Laydown Areas	0	65	65
Miscellaneous (Main Gate, etc.)	0	7	7
TOTAL	1,429	1,931	3,360

* Some surface disturbance already exists at these locations.

** Does not include roads within pits or stockpiles.

Mine and mining-related support facilities and operations that will be developed as part of this Project are described in detail below and organized into the following five subsections: Mining and Ore Processing Operations, Support and Ancillary Facilities, Environmental Protection Measures, Closure and Reclamation Measures, and Employment.

⁹ All acreages throughout this EIS are approximate. Final acreage for realty actions will be determined by cadastral survey or some other approved method.

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2.1.2.1 Mining and Ore Processing Operations

2.1.2.1.1 Open Pits. Under this plan of operations, two open pit mines, Dos Pobres and San Juan (see Figure 2-1), will be developed. Table 2-3 provides a summary of projected production rates for each of the mines during the 16-year life of the Project. Production rates are estimates based upon the current Project mine plan and could change as conditions and technologies change.¹⁰

Project Year	Dos Pobres Mine	San Juan Mine	ANNUAL TOTAL
1	0	0	0
2	74,695,000	0	74,695,000
3	93,677,000	0	93,677,000
4	92,637,000	0	92,637,000
5	55,182,000	35,755,000	90,937,000
6	64,432,000	26,485,000	90,917,000
7	35,515,000	55,205,000	90,720,000
8	81,342,000	8,840,000	90,182,000
9	54,861,000	23,457,000	78,318,000
10	27,813,000	37,054,000	64,867,000
11	24,717,000	29,913,000	54,630,000
12	20,283,000	34,941,000	55,224,000
13	10,477,000	41,290,000	51,767,000
14	0	50,062,000	50,062,000
15	0	24,128,000	24,128,000
16	0	8,343,000	8,343,000
TOTAL	635,631,000	375,473,000	1,011,104,000

The Dos Pobres open pit mine is located entirely on PDSI patented lands. Phelps Dodge implemented development work on the property for an underground mining operation during the 1960s and 1970s. Underground development of the sulfide orebody at Dos Pobres ceased in the early 1980s; however, the buildings and other facilities at Site No. 1 and Site No. 2 (see Figure 2-1) continue to be used by PDSI for mineral exploration work and other activities.

¹⁰ This projection reflects the best data available from current mining planning and is the basis for the environmental evaluation herein. However, any significant increase in estimated production rates or footprint expansion would require modifying permits for air quality, groundwater protection, and surface waters under Section 404 and 402 of the Clean Water Act and would thereby trigger additional environmental evaluation.

Surrounding the planned Dos Pobres pit is an approximately 1,300-foot setback in which no leach pad or development rock stockpiles are planned (see Figure 2-1). This setback has been designed to allow for potential future mining of the deeper sulfide milling reserves that underlie the leachable ore at Dos Pobres.

At completion of leach mining operations, the Dos Pobres pit will be nearly circular with a diameter of approximately 4,200 feet and a depth of about 1,400 feet (2,600 feet above mean sea level). The pit design specifies a 50-foot bench height and 120-foot-wide haul roads with 10 percent gradient haulage ramps to develop a smoothed pit design and minable reserves. A 100-foot-high, 48° double bench configuration will be used for all areas of the pit except in the Tertiary Gila Mountain Volcanics located on the upper southwestern area of the deposit, where a 48° single bench design will be incorporated. Once the pit is further developed, the stability of side slopes will be reevaluated and bench design modified as necessary.

The San Juan property was mined for a short period around the turn of the century following discovery of high-grade chalcocite copper veins. Mining resumed at San Juan during the late 1960s and early 1970s with processing of ore from a small open pit to produce copper precipitate. Existing areas of disturbance at San Juan include the former mine pit, leach pads, development rock stockpiles, and concrete foundations from facilities associated with the former leach process operations. These existing disturbances occur on both private lands owned by PD and on public lands managed by the BLM.

Phelps Dodge acquired the San Juan property in 1994 and has since undertaken efforts to mitigate the effects of past mining activities. Cleanup efforts have included removing debris; installing an impermeable composite liner system in the existing leach solution collection pond; constructing six shallow reclaim wells in an interception trench upgradient of the stormwater collection pond, and construction of diversions to manage stormwater. Most of the areas of existing disturbance associated with the San Juan property fall within the San Juan pit limits currently planned for the Project.

At completion of mining, the San Juan pit will be somewhat oval-shaped with a length and width of approximately 5,000 feet and 3,800 feet, respectively. The ultimate depth of the pit will be approximately 1,000 feet (3,150 feet above mean sea level). The interamp angle for San Juan is based on a 48 degree, 100-foot-high, double bench configuration for all areas of the pit.

Leach ore and development rock (unmineralized and low-grade material) will be mined from the proposed Dos Pobres and San Juan open pits using conventional drilling and blasting techniques. Blast holes will be drilled in a grid pattern to an average depth of 65 feet, loaded with ammonium nitrate and fuel oil (ANFO) and topped off with a sand and gravel mixture. When the explosives are detonated, usually once a day and always during daylight hours, the hard rock will be reduced to a manageable size (called run-of-mine or ROM) for loading and hauling.

Depending on its copper content, ROM leach ore will be either hauled directly to the leach pad or hauled to a crushing system. Development rock will be hauled to two unlined development rock stockpiles, identified as East and West development rock stockpiles in Figure 2-1 (see also Section 2.1.2.1.6).

Mining will occur on a 24-hour-per-day, 365-day-per-year schedule over the 16-year life of the mines. Operations will be divided into three distinct periods. The first period, which covers Years 1 through 4, involves mining leach material exclusively from the Dos Pobres deposit (see Table 2-3). A pre-production period of four months will be required to expose the orebody and place ore on the leach pad to provide the surface area required to support initial operations. Mining rate during Years 1 to 4 will average approximately 238,000 tons per day (tpd). Three electric shovels with 53 cubic-yard capacities, assisted by one, 21-cubic-yard hydraulic front-end loader, will provide the loading capacity required to maintain production. The drill fleet will consist

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of four production units capable of drilling 9⁷/₈ inch- to 12¹/₄-inch-diameter holes. Twenty-two haul trucks with 240-ton to 300-ton capacities will be required during this period.

During the second period (Years 5 to 13), mining operations at the Dos Pobres and San Juan deposits will be combined. During this time, the higher grade, higher stripping ratio leach ore from Dos Pobres will be mined in conjunction with the lower grade, lower stripping ratio leach ore from San Juan. By blending the leach ores from the two deposits, the overall mining rate will be held relatively constant at an average of approximately 248,000 tpd from Years 5 through 8. During this period, the required fleet of haul trucks will reach a peak of twenty-six, 240- to 300-ton capacity trucks due to longer haulage profiles. During the remainder of the period (Years 9 - 13), the mining rate and haul truck requirements will decline, with the mining rate averaging approximately 167,000 tpd. The Dos Pobres oxide leach reserve will be depleted at the end of this period.

The third period, Years 14 - 16, will consist entirely of mining the remainder of the San Juan deposit. Mining rates and copper cathode production will decline during this period. Average mining rates will be approximately 75,000 tpd. The San Juan reserves will be depleted at the end of this period.

2.1.2.1.2 Crushing and Material Handling. The higher-grade leach ore will be delivered to a crushing facility consisting of a three-stage crushing system (primary, secondary, and tertiary plants), conveyors and feeders for handling materials, and an agglomeration system. This facility will be capable of reducing ROM material to a nominal 0.5-inch minus size at a planned production rate of 100,000 tpd. The crushing plants will be centrally located between the Dos Pobres and San Juan pits, while the agglomeration facility will be located at the northern edge of the leach pad. Figure 2-2 presents a flow diagram of the crushing and materials handling process.

The primary crushing plant may include either a fixed 60 inches x 109 inches primary gyratory crusher or a 48 inches x 60 inches primary jaw crusher that will be fed by 240- to 300-ton-capacity haulage trucks. The primary crushing plant will produce an 80 percent passing 7 inches crushed ore product, which will be conveyed to a coarse ore surge pile. From there, ore will be moved by belt feeders to the secondary crushing plant.

In the secondary crushing plant, two primary vibrating screens will separate minus 3-inch material from the ore flow stream, and the oversize material will be crushed by two MP1000 secondary crushers, set at a closed side setting of 1.25 inches. The secondary crusher product will be combined with the screen undersize product and conveyed to the tertiary circuit surge bin. In the tertiary crushing plant, material will be reclaimed from the bin by five belt feeders, each of which will directly feed five tertiary screens. The tertiary vibrating screens will separate the minus 7/8-inch material from the material flow stream, and the oversize material will be crushed by five MP1000 tertiary crushers, set at a closed side setting of 0.5 inch.

The final product from the tertiary crushing system will be conveyed to a fine ore surge pile, and from there to a splitter chute. The splitter will divert the material to either of two conveyors that will directly feed two parallel agglomeration drums. Each agglomeration drum will be approximately 15 feet in diameter and 45 feet long. Crushed ore within the drums is pre-treated with 20 to 30 pounds of sulfuric acid and water per ton of ore to reach an approximate moisture content of between 6 and 8 percent. As the drums rotate, the wetted ore tumbles, enabling uniform contact of the acid and water with the ore. This causes the fines to adhere to the larger rocks and the resulting agglomerate. The agglomerated ore will then be transferred to an overland conveyor that delivers it to the leach pad. The agglomeration area and overland conveyor will incorporate a lined containment system designed to drain to the leach pad.

2.1.2.1.3 Leach Pad. A single, rectangular, approximately 922-acre leach pad will be located south of the Dos Pobres pit, between Cottonwood Wash on the east and Watson Wash on the west (see Figure 2-1). The leach pad will be developed from south to north in 20- to 40-foot-high lifts. Based on current projected production rates, the leach pad is expected to reach a height of approximately 450 feet, but as stated on p. 5-3, will be designed to accommodate a potential ultimate height up to 600 feet¹¹. The leach pad will be constructed with setback benches to achieve a final overall slope of no greater than two horizontal to one vertical (2H:1V) (see Figure 2-3). The top surface of the pad will ultimately slope at approximately the same degree as the existing natural terrain.

The site selected for the leach pad offers sufficient slope (generally steeper than four percent) to allow use of the natural contours of the terrain for collection of the copper-laden pregnant leach solution (PLS). Existing terrain in the northern portion of the pad is significantly steeper than in the southern portion.

The entire leach pad will be lined. The key elements of the design include a prepared subgrade, a composite liner system consisting of underliner material and a synthetic geomembrane liner, and overliner material (see Figure 2-3). The subgrade will be cleared of all plants and grubbed of shallow roots. Regrading of the natural terrain will be limited to what is required to ensure drainage and that the internal base slopes of the pad are no steeper than 3H:1V.

The underliner consists of low-permeability bedding soil, which will be laid down, graded, moisture-conditioned, and compacted to 90 percent maximum dry density (ASTM-1557), at a moisture content several percentage points dry of optimum. The low-permeability soil will be placed in a single loose lift of 18 inches compacted to the nominal 12-inch compacted thickness. The compacted surface will be smooth-rolled and promptly covered with geomembrane to minimize the opportunity for desiccation and cracking. The low-permeability soil will have a saturated hydraulic conductivity of approximately 10^{-6} cm/sec. A suitable source of low-permeability, compactible soil has been identified on Phelps Dodge's patented land north of the Safford Municipal Airport (see Figure 2-1).

Covering the underliner material will be a synthetic 60-mil Linear Low Density Polyethylene (LLDP) geomembrane liner. Atop the synthetic liner will be an 18- to 24-inch "buffer" layer of overliner material (potentially crushed or screened rock) to protect the pad against the impact from placement of the crushed and ROM leach material. The overliner material will also facilitate proper drainage of the pad to minimize hydraulic head over the liner.

Construction of the composite liner system will begin at the downstream toe of the pad and proceed in an upstream direction. The liner system will be built incrementally over the first several years of operations. The leach pad will utilize existing ridge lines, constructed berms, and perimeter channels and internal piping to manage stormwater and PLS routing through and around the leach pad. Stormwater management activities associated with the leach pad will minimize the volume of stormwater that comes into contact with the pad and control stormwater that has come into contact with leach material.

The leach pad design includes an internal stormwater collection channel (Figure 2-4) that will divert clean stormwater away from the pad during early years of operation, when the leach pad is confined to the southern portion of the site below the ditch. Later, this ditch will be incorporated into the leach pad drainage system

¹¹ Stability analyses were conducted for the leach pad to simulate static and pseudo static (earthquake) loading conditions at various stages of pad development, up to 600 feet high. In all cases, the factors of safety calculated for the leach pad surpass the minimum requirements set forth by ADEQ BADCT guidelines. Additionally, liner testing (puncture) for the pad was conducted to simulate a pad height of 600 feet with a 50 percent safety factor (liner loading actually simulated the pressure that would result from ore 900 feet high). The liner did not fail (puncture) under the stresses applied (PDSI 1998).

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to provide for internal collection of PLS flows during leaching on the northern portion of the pad. The ditch will intercept PLS flows from the northern portion of the leach pad and direct them to the east edge of the pad where they will flow to the leach pad solution collection channel.

Agglomerated ore from the crushing facility will be transported and placed on the leach pad by a series of belt conveyors and a radial stacker. Lower-grade, ROM-sized leach ore from the pits will be conventionally placed on the leach pad by haul trucks, primarily around the perimeter of the crushed ore. Raffinate, an acidic aqueous solution, will be applied to the surface of the leach pad using drip irrigation lines. A process flowrate of approximately 20,000 gpm of raffinate at 0.002 to 0.004 gpm/square foot application rate is planned. As the leach solution percolates through the copper-bearing ore, it will dissolve soluble copper minerals contained in the rock. The copper-laden water (i.e., PLS) will flow by gravity into a series of perforated pipes that conduct the flow by gravity into a downstream, perimeter solution collection ditch. The solution collection ditch is located on the downgradient edges of the leach pad at the southern and southeastern limits (Figure 2-4). The solution collection ditch transfers PLS to the low point in the leach pad, which is immediately adjacent to the southeast corner. PLS will then exit the lined leach pad and be routed to one of two basins within the lined excess process solution impoundment located at the southeastern toe of the pad. From there it will be routed to the SX/EW plant.

2.1.2.1.4 Leach Solution Collection/Distribution Facilities. The leach solution collection/distribution system includes an excess process solution impoundment located at the southeastern toe of the leach pad, a raffinate tank at the SX/EW lined tankfarm, and various piping and conveyance systems. The excess process solution impoundment is located upgradient of the stormwater impoundment, and is designed such that excess flows are directed via a lined channel to the stormwater impoundment.

PLS from the leach pad solution collection ditch flows to the excess process solution impoundment. From there, the PLS flows by gravity through a pipeline to the SX/EW plant. Flows greater than that which can be processed by the SX/EW plant are stored in the excess process solution impoundment or routed from the excess process solution impoundment into the raffinate tank. The raffinate tank provides surge capacity for raffinate and/or excess PLS to be sent back to the leaching operation.

The excess process solution impoundment will be a double-lined process solution pond constructed through excavation and placement of an earth fill embankment along the downstream edge. It will cover approximately eight acres and have a total capacity of 25 million gallons divided between two cells of 12.5 million gallons each. Construction will be similar to that of the leach pad. The subgrade will be cleared, grubbed, and compacted, and overlain with a composite liner system consisting of a minimum of six inches of compacted clayey soil and a geomembrane double liner and leak collection and removal system (LCRS). The lower liner will consist of a single geomembrane of at least 60-mil thickness over a minimum six inches of soil compacted to achieve a saturated hydraulic conductivity of no greater than 10^{-6} cm/sec. The upper liner will be a single geomembrane of at least 60-mil thickness. Sandwiched between the two will be the LCRS, which has been designed to result in minimal hydraulic head on the lower liner and provide for the collection and removal of liquid between the upper and lower liners. Any PLS in the LCRS will be rerouted into the raffinate collection tank for reprocessing.

At the SX/EW plant, copper will be extracted from the PLS. The resulting solution, called raffinate, will then be processed through an organic reagent recovery tank prior to being pumped back to the leach pad through HDPE and stainless steel pipelines. A raffinate booster station may be required during later years of leaching operations. The extracted copper, will be plated onto sheets producing copper cathode for shipment off-site.

2.1.2.1.5 Solution Extraction and Electrowinning (SX/EW) Processing Facility. The solution extraction (SX) and electrowinning (EW) processing facility will consist of two primary components (SX plant and EW tankhouse) (see Figure 2-5) and is located southwest of the leach pad.

The solution extraction plant (SX plant) will be located adjacent to the electrowinning tankhouse (EW tankhouse) at a site west of the stormwater impoundment. The SX plant will receive PLS from the excess process solution impoundment and will extract copper from the PLS for further processing in the EW tankhouse.

The SX plant will include one train of mixer-settler tanks configured in a series parallel arrangement, a tankfarm (including a raffinate tank and a runoff collection tank), and pumping systems. The SX train will include two series extraction mixer-settlers, one parallel extraction mixer-settler, one wash mixer-settler, and two stripping mixer-settlers. In the extraction mixer-settler tanks, PLS is mixed vigorously with an equal volume of an organic solution containing 90 percent petroleum-based diluent and 10 percent copper extraction reagent. After mixing, the solutions are allowed to separate. The aqueous solution, which has been stripped of its copper, is again called raffinate and settles to the bottom of the mixing tank and is then sent to an organic recovery tank to recover and recycle residual organic reagent back to the extraction tanks. This raffinate solution is then sent back to the leach pad for another leach cycle. The organic solution containing the copper ions, now called loaded organic, floats to the top of the settling tank and is pumped to the wash mixer-settler tank.

In the wash mixer-settler tank, the loaded organic solution is mixed with water to remove impurities. The washed organic solution then flows to the stripper mixer-settler unit and is mixed with an aqueous solution containing 20 percent sulfuric acid (electrolyte). An ion exchange process causes the copper ions to transfer from the loaded organic to the electrolyte, now referred to as rich electrolyte. Rich electrolyte is then pumped to the EW tankhouse.

The tankfarm will contain a 426,000-gallon raffinate tank, a 1.9-million-gallon runoff collection tank, electrolyte and reagent storage and process tanks, and solution filtration systems. The tankfarm will be an open air facility, constructed in a concrete-lined containment area excavated and designed to contain stormwater runoff and excess process solutions from the SX/EW operations area. These solutions will be collected in the runoff collection tank. To keep organic solutions separated from aqueous solutions, all the loaded organic tanks, diluent and extractant storage tanks, and organic processing equipment are located together in one contained area of the tankfarm.

The electrowinning tankhouse, adjacent to the SX plant (refer to Figure 2-5), will house electrowinning cells constructed of polymer-concrete, overhead cranes, and a cathode stripping machine. Rectifiers used to convert incoming electric power to direct current for the electrowinning process will be located outside the tankhouse. Propane or natural gas-fired boilers, used for heating rich electrolyte to 110°F to 125°F to increase electrowinning efficiency, will be housed in a small building nearby.

Inside the electrowinning tankhouse, the electrolyte is routed through a series of tanks, in which insoluble lead plates are hung as anodes. Stainless steel plates (also called “blanks”) are suspended in the cells between the anodes and serve as cathodes onto which the copper will plate. Direct current electricity is applied to the anodes causing the copper ions in the electrolyte to plate onto the stainless steel blanks. The cathodes are removed from the cells after approximately seven days, and the copper is stripped from the stainless steel blank. Copper from the Dos Pobres/San Juan Project will be delivered by truck from the EW tankhouse to the PD copper rod mills in Miami, Arizona, and El Paso, Texas, or to other customers. The partially depleted electrolyte solution in the EW cells is pumped back to the tankfarm for reuse, and the entire leaching and copper extraction process repeats itself.

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2.1.2.1.6 Development Rock Stockpiles. Unmineralized and low-grade material (referred to herein as development rock) will be hauled at ROM size to two unlined stockpiles that will not be leached. Development rock stockpiles will occupy approximately 834 acres total. One stockpile will be situated to the west of the Dos Pobres pit (the West development rock stockpile), and the other to the south of the San Juan pit (the East development rock stockpile; see Figure 2-1). Stockpiles will be constructed in 50-foot lifts to approximately 400 feet above ground level.

A liner is not proposed for these development rock stockpiles as the neutralization capacity of the non-ore material (i.e., development rock) present within the orebody exceeds the rock's acid-generating potential (Dames & Moore 1997a). Analysis was performed on representative composite samples collected from the existing drill pulp archives for the Dos Pobres and San Juan orebodies. Twenty-two composite samples, representing more than 11,900 feet of drill core, were analyzed for acid-base accounting (ABA), synthetic precipitation leach procedure (SPLP), and a suite of 21 elements. Based on the ABA testing, the potential for development rock to generate a low (acidic) pH effluent is considered very low (PDSI 1996, Water Management Consultants 1998). The weighted average net neutralization potential of the composite samples is 49 tons calcite equivalent per 1,000 tons.¹² SPLP tests were run on 22 composite samples representative of the range of lithological and mineralogical material to be included in the development rock stockpiles. The metal content of the effluent from each test was below Arizona Primary Drinking Water Standards maximum contaminant levels (mcl) (ibid.).

2.1.2.1.7 Soil and Growth Medium Stockpiles. Soil excavated during leach pad site preparation and suitable rock material excavated during mine pre-stripping will be stockpiled for use as growth media and capping material. Seven soil and growth medium stockpiles covering a total of roughly 123 acres will be created. They range in size from about 2 acres to about 51 acres. The locations of these stockpiles are depicted in Figure 2 -1. These stockpiles will be stabilized, as necessary, to prevent excessive losses from erosion and marked with signs identifying the material as soil. Other soil stockpiles may be developed if it is determined that sufficient soils exist in the footprints of the development rock stockpiles to economically justify excavation prior to the lateral build-out of the development rock stockpiles.

Stabilization of soil stockpiles would be accomplished by shaping slopes to minimize erosion and placing silt fence structures, as necessary, around the downgradient slope of the stockpiles. The side slopes will be shaped by a bulldozer traveling perpendicular to the slope, forming small berms to trap precipitation. Side-slopes and the tops of the soil stockpiles may be seeded with native perennial species as an additional erosion control measure if necessary.

2.1.2.2 Support and Ancillary Facilities

2.1.2.2.1 Water Supply. Based upon the results of the groundwater investigation program, PDSI has determined that an aquifer located in the volcanic rocks near Dos Pobres and San Juan will be developed to meet Project water requirements. This aquifer has historically provided approximately 1,400 gallons per minute (gpm) to the No. 1 shaft at Site No. 1. Investigations which have been underway since June of 1995 have indicated the presence of an aquifer capable of sustaining at least 5,000 gpm (8,065 af/yr) flow rate.

Water demand estimates for the Project have been based upon historical mine, shop, and SX/EW make-up requirements at other Phelps Dodge operations in Arizona and New Mexico as well as additional information developed during a Feasibility Study conducted by PDSI. The average amount of water required for the

¹² According to the British Columbia Acid Mine Drainage Task Force (BCAMDTF) criteria, rock that is non-acid-generating has a net neutralizing potential (NNP) of equal to or greater than 20 tons calcium carbonate over 1,000 tons of rock.

Project is forecast at 3,431 gpm (5,533 af/yr), while the total water demand over the life of the project is predicted to be 88,528 af (PDSI 2001). On average, six percent of the leach solution flow rate will have to be replaced due to loss through evaporation and initial wetting of new leach ore. Table 2-4 summarizes the projected average water demand through the life of the Project.

Project Year	Mining Dust Control ¹ (gpm)	Crushing and Material Handling ² (gpm)	SX/EW ³ (gpm)	Ore Moisture Consumption ⁴ (gpm)	Potable and Misc. (gpm)	Total (gpm)	Total Volume (af/yr)
1	1,260	0	0	0	10	1,270	2,048
2	1,260	347	800	389	10	2,805	4,523
3	1,890	347	1,100	429	10	3,776	6,089
4	1,890	347	1,100	442	10	3,789	6,110
5	1,890	347	1,100	362	10	3,709	5,981
6	1,890	347	1,100	409	10	3,756	6,057
7	1,890	347	2,100	743	10	4,090	6,604
8	1,890	347	2,100	743	15	4,095	6,604
9	1,890	347	2,100	449	15	3,801	6,130
10	1,890	347	2,100	596	15	3,948	6,367
11	1,890	347	2,100	489	15	3,841	6,194
12	1,890	347	2,100	516	15	3,868	6,238
13	1,890	347	2,100	502	15	3,854	6,215
14	1,890	347	2,100	509	10	3,856	6,218
15	1,260	222	1,800	214	10	2,506	4,041
16	1,260	76	1,800	74	10	1,920	3,096
Avg.	1,733	301	956	429	12	3,431	5,533
TOTAL	-	-	-	-	-	-	88,528 af

¹ Assumes 630 gpm of water per water truck required for dust suppression purposes, based on historic water use of other PD facilities and includes water for drilling, dust suppression on roads, and for other mining-related activities.

² Assumes 5 gal/ton ore processed.

³ Assumes 6% make-up for evaporative water loss, offset by an estimated gain from precipitation equivalent to 100 gpm (assume 25% net precipitation enters system after evaporation).

⁴ Crushed ore moisture raised from 4% from pit to 7% through dust control wetting and agglomeration in the crushing/material handling system. The ore moisture is increased during leaching to above 10% and decreased after leaching to approximately 9%. Net water consumption is 2% of crushed ore tonnage by weight (9% - 7%). ROM ore moisture is estimated at 4% from the pit. It is increased during leaching to above 10% and decreased after leaching to about 8%. Net water consumption is 4% of ROM tonnage by weight (8% - 4%).

Groundwater near the Dos Pobres and San Juan mines will be developed for use by the Project. Five 1,350 gpm vertical pumps are currently planned to will be established at wells constructed in the project area. Water will be pumped from wells to water storage tanks that will gravity feed to various project facilities. The main

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distribution tank (420,000 gallons) will be located near the mine fuel station; two head tanks (188,000 gallons each) will be located above Site No. 2; and a smaller tank (50,000 gallons) will be located at Site No. 1. The main distribution tank will supply water to the mines, the truck shop complex, and the crushing/material handling system. The head tanks at Site No. 2 will supply water to the SX/EW plant as well as to facilities at Site No. 2.

2.1.2.2.2 Electric Power. Total average power requirements for the Project are estimated to be 59.9 megawatts. The power system for the Project will include construction of about seven miles of a primary 230 kilovolt (kV) transmission line from the existing 230 kV Hackberry line to a main substation that will be located on Phelps Dodge's property west of the Lone Star Road. At the main substation, power will be transformed to 69 kV and distributed via approximately 17 miles of overhead transmission line to the mine areas, stormwater impoundment, raffinate booster station, crushing/material handling system, and the SX/EW substation.

A 69 kV powerline will be constructed around the Dos Pobres and San Juan pits to power two mine substations, a crusher substation, a maintenance area substation, a pumping substation, and the Site No. 2 substation. The mine substations will supply 7,200 volts (V) of power to the electric shovels and drills. The crusher substation will supply 4,160 V power for the crushing and material handling system. The maintenance area substation will provide 4,160 V power to the truckshop and maintenance shops near San Juan. The pumping substation will supply 4,160 V power for the raffinate pumps and stormwater impoundment dewatering pumps. The Site No. 2 substation will provide 4,160 V power to that area. A separate 69 kV powerline will be constructed from the main substation to the SX/EW substation where voltage will be reduced to 13.8 kV for distribution to the EW tankhouse and the SX plant.

Transmission lines will be constructed using single pole structures for the 69 kV lines and H-frame double pole structures for the 230 kV line. All poles will be wooden or metal and will range in height from 45 to 65 feet, except for the 230 kV power line structures, which will range in height from 75 to 85 feet. Transmission and distribution lines will be constructed to include raptor-protection to minimize the potential for electrocution of perching birds of prey.

2.1.2.2.3 Compactible Soil Borrow Area. The Lone Star Compactible Soil Borrow Source is located on PD's private lands in Sec. 25, T6S, R26E (Figure 2-1). This site is approximately 4.5 miles southeast of the leach pad. Material from this borrow source will be used to construct the composite liner system for the leach pad and will be transported by truck to the leach pad along an approximately 110-foot-wide aggregate roadway. The borrow area will be approximately 49 acres in size.

The compactible soil material to be mined is approximately 10 feet below the surface; total excavation depth will be approximately 50 feet. Overburden removed to access the soil material will be stockpiled west of the borrow source and will cover roughly 18 acres. The compactible soil is primarily clay from a lake-bed deposit and is relatively homogeneous, with only occasional layers of fine sand or low plasticity clay and silt. The clay in this deposit is generally stiff and dry to lightly moist. Dust control measures per ADEQ requirements will be implemented at the borrow area.

2.1.2.2.4 Shops, Office, and Administration. A service complex that includes a heavy duty truck shop, maintenance shop, fire truck and ambulance building, cable repair shop, recycling center, oil and lubricant storage, fuel station, and a truck wash facility will be built south of the San Juan mine. A mine fuel service station will also be located south of the Dos Pobres Mine, northwest of the crusher facility.

Site No. 2, west of the proposed leach pad location, is an existing facility that contains general offices, a change room building, and a warehouse facility. This site will be refurbished. All administrative support functions for the Project, such as operations management, mine planning, drafting, ore control, and safety will be conducted from the general offices. Mine operations and crew line-up will also be conducted from this site. The existing warehouse contains 11,000 square feet of storage space, which will be used for receiving, storing, and disbursing supplies and materials. In addition, Site No. 2 will be equipped with a service station for small vehicles.

2.1.2.2.5 Communications. Communications for the Project will include hard wiring of a telephone cable in a loop configuration between the main security gate, Site No. 2, the truck shop complex, and the SX/EW plant. Radio communications require construction of a repeater transmitter tower on a hill located south of the San Juan Mine (see Figure 2-1) and three base stations for use at the administration building, mine office, and SX/EW facility. The repeater facility will be a steel lattice structure approximately 120 feet tall with a 17 x 17 foot base, will cover approximately one acre, and will include a 12 x 16 foot concrete building to house radio equipment.

2.1.2.2.6 Transportation/Access/Security. New infrastructure requirements for the Project include upgrading existing access roads, constructing employee parking facilities, and establishing additional security gates. Road crossings and access and haul roads will be constructed with culverts or at grade. A fence will be constructed around the mine facility as needed to provide for security and safety and to keep cattle on adjacent lands off the mine property. This fence will tie into existing grazing allotment boundary fences wherever possible. A main security gate will be installed on the Phelps Dodge Mine Road (PD Mine Road) to control all traffic and access to the mines and SX/EW site. A secondary security gate will be installed on the San Juan Mine Road at the boundary of public and private lands, eliminating public access on this road. The main security gate will be equipped with automatic truck weigh scales which will weigh incoming and outgoing truck traffic and record deliveries through the use of bar coding. Employee parking will be provided at Site No. 2 and the SX/EW plant site.

PD Mine Road will be chip-sealed from its intersection with the Safford-Bryce Road to Site No. 2, roughly seven miles. Beyond this point, PD Mine Road and other access roads will be surfaced with aggregate. The current at-grade crossing of Talley Wash will be upgraded to a box culvert crossing to allow all-weather access.

New traffic to and from the site is expected to occur in two distinct phases: the 15-month construction phase and the 16-year operational phase. During the construction phase, traffic to and from the mine site will be associated primarily with construction workers and equipment deliveries and is estimated to peak at 1,708 vehicle trips per day (854 round trips), of which 208 are projected for deliveries and 1,500 are worker trips. Figure 2-6 depicts the anticipated peak distribution of vehicle trips over main roads and bridges during the construction phase of the Project; Figure 2-7 depicts average trip distribution for both trucks and employees over major roads in the region during the operational phase.

During the operational phase, average daily traffic is forecasted at 325 employee round trips and 80-90 truck round trips (Figure 2-7). Of the approximately 80 to 90 truck round trips to and from the Project, about 75 percent (60-68 round trips) are expected to come from the east and south and use the Solomon Bridge to cross the Gila River. The remaining 25 percent of trucks (20-22 round trips) are expected to arrive from the west and use the Thatcher Bridge (Reay Lane Bridge) to access the project site. These routes minimize truck travel through the major commercial area of Safford and the potential for traffic impacts.

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The shipping company that PD will select to transport sulfuric acid to the mine will be required to comply with the applicable federal and state regulations governing the transport of cargo, including hazardous materials. One potential company has described the following internal controls that would apply to the transport of sulfuric acid (M. Maxwell, BJ Cecil Trucking, pers. comm.):

- < No tanker deliveries will exceed the maximum 80,000 gross vehicle weight, therefore, overweight permits will not be necessary.
- < Truck speeds are governed to 64 mph with a maximum cruising speed of 62 mph.
- < Drivers must have MSHA and OSHA training.
- < Mandatory vehicle check points will be established at specific locations along all haul routes.
- < Vehicles will be checked by drivers at least every two hours or 100 miles.
- < The tank trailers will be state-of-the-art with safety valves and rupture disks designed to minimize the potential for spills.
- < In the event of an acid leak, soda ash or lime can be used to neutralize the acid.

2.1.2.2.7 Powder Magazine and Prill Storage. The powder magazine and ammonium nitrate prill storage will be located in the vicinity of Site No. 1, south of the existing Site No. 1 stormwater diversion channel.

2.1.2.2.8 Aggregate Materials. Aggregate materials will be used for a variety of purposes, including road base fill material, riprap for stormwater diversion channels and road crossings, aggregate for concrete, and other uses. Two aggregate borrow sources totaling about 136 acres have been identified within the project area (Figure 2-1). One is located just south of the leach pad; the other at an existing aggregate borrow source Watson Wash, west of the leach pad. Approximately 19 million tons of material will be excavated from aggregate borrow sources over the life of the Project. Of the material excavated, 40 to 60 percent could be suitable for use as aggregate after screening. The remainder of the material will be stockpiled for use in reclamation activities.

2.1.2.3 Environmental Protection Measures

A variety of environmental protection measures have been incorporated into the Mining Plan of Operations to meet applicable standards including those of regulatory agencies such as the ADEQ and COE that have review and approval authority over the proposed Project. These measures range from integrated stormwater management programs to concurrent and post-closure reclamation plans. Environmental protection measures that have been incorporated into the mine plan are summarized below.

2.1.2.3.1 Wastewater Treatment (Non-Process Related). Septic systems will be constructed to handle sewage treatment at the SX/EW plant Site No. 1, Site No. 2, and the truck shop complex area. Septic systems will be developed in compliance with ADEQ and Graham County's septic permits requirements.

2.1.2.3.2 Surface Water Management. The Project will be constructed and operated as a "zero-discharge" facility, meaning that all process waters and stormwaters that come into contact with process facilities will be contained on-site rather than discharged off-site into waters of the United States. Development of the Project as a zero-discharge facility will necessitate diverting stormwater around the project area to reduce run-on into

the pits and ponding against stockpiles, and to prevent release of flows potentially impacted by the leaching or mining operations into surface waters. The stormwater management facilities are designed to ensure that there are no potential points of stormwater discharge from the mines for storms as large as the 100-year/24-hour and 100-year/10-day storm events. The stormwater impoundment will retain all incidental flows from the leach pad (including stormwater and leach pad drain-down that would occur during a power outage of up to 24-hours in duration). A series of retention dams located upstream, downstream, and within the footprints of the development rock stockpiles will prevent off-site surface water discharge from storms during the early years of mine development. As the size of the stockpiles increases, the potential runoff volumes will decrease, and the same structures are likely to provide equivalent protection against even large precipitation events. The general siting of proposed surface water control structures is depicted in Figure 2-1 and discussed in detail in the following sections.

< **Surface Water Diversions.** Four diversion channels, South, Peterson Wash, West, and Site No. 1, will be constructed upgradient of the stockpiles and open pits to divert clean stormwater runoff around and through the site, preventing the water from being impacted by mining activities. A typical cross section of a diversion channel is provided on Figure 2-8. The diversion channels will require energy dissipation structures at the outfalls and areas of fill where the alignments cross small drainages. A typical cross section of riprap reinforced channel transition area is depicted in Figure 2-9. Energy dissipation riprap structures will be placed at locations where diversion channels discharge into existing washes. The criteria for riprap sizing and for apron dimensions are from Hydraulic Design of Energy Dissipaters for Culverts and Channels, Hydraulic Engineering Circular (HEC) 14, published by the Federal Highway Administration. Riprap is placed in areas of the apron excavated within alluvium and may not be in the areas of the apron excavated in rock.

In order to minimize the potential for erosion, specific design criteria have been developed to reduce the sharpness of curves in portions of the West and South diversion channels.¹³ Channel sections that contain sharp curves will be constructed of riprap-lined fill material, with 2.5H:1V side-slopes. A conceptual detail for these areas of reduced radius of curvature is provided in Figure 2-10.

All four diversions are designed to control stormwater runoff from the 100-year/24-hour storm event (Dames & Moore 1999a). Each is briefly described below.

C West Diversion. This channel will run east to west across Watson Wash and unnamed tributaries of Watson Wash, upstream of the Dos Pobres development rock stockpile, and will convey stormwater runoff into an unnamed tributary of Coyote Wash. The West Diversion system will require three deep cuts through natural saddles along the alignment. The channel will be approximately 13,500 feet long, with about 27 percent of its length requiring blasting.

The channel alignments for the lower and upper portions of West Diversion are shown on Figures 2-11 and 2-12, respectively. The channel slope is set at 0.5 percent. Table 2-5 provides channel and fill dimensions at locations (identified as CRW1 through CRW6 on Figures 2-11 and 2-12) where steep topography makes reduction of the channel curves necessary. Table 2-6 provides dimensions of these energy dissipation riprap structures at locations where the channel discharges into the wash, for locations shown on Figures 2-11

¹³ The design criterion that was applied for the maximum radius of curvature is to maintain superelevation of design (100-year) flow depths against outer channel banks to less than 0.5 feet and maintain a radius of curvature at least twice the width of the channel top width or 50 feet, whichever is greater.

and 2-12. A riprap apron is not planned at the outfall at section W9, shown on Figure 2-12, because of the relatively small contribution of flow at that location to the existing wash.

- C Site No. 1 Diversion.** This is an existing stormwater diversion structure and is approximately 2,800 feet in length. It runs generally west to east across Talley Wash, upstream of the Dos Pobres pit, and conveys stormwater runoff to an existing collection pond. It is designed to discharge stormwater to Cottonwood Wash only during the 100-year/24-hour event.
- C South Diversion.** This channel will run north to south across drainages northeast of the San Juan mine, and will convey stormwater into an unnamed tributary of Peterson Wash. The channel length will be approximately 2,800 feet long and will be constructed in soil or rippable material.

The channel alignment for the South Diversion is shown in Figure 2-13. The channel slope is set at 0.5 percent. Table 2-5 provides channel and fill dimensions at locations where curve reduction will be necessary (shown as cross sections CRS1 and CSR2 on Figure 2-13). Table 2-5 provides dimensions of energy dissipation riprap structures for the South Diversion channel transition into a tributary of Peterson Wash, as shown on Figure 2-13.

Table 2-5. Dimensions for Radius of Curvature for Diversion Channels

Diversion Channel Curve	Min. Radius of Curvature* (ft)	Flow Depth (ft)	Channel Depth (ft)	Channel Bed Width (ft)	Ave. Width of Fill (ft)
West CRW1	82	4.2	5.5	20	115
West CRW2	85	4.5	6.0	20	130
West CRW3	85	4.5	6.0	20	100
West CRW4	85	4.5	6.0	20	120
West CRW5	85	4.5	6.0	20	170
West CRW6	110	7.0	9.0	20	300
South CRS1	68	2.9	4.0	15	120
South CRS2	59	3.8	5.0	15	170

[Note: The radius of curvature reduction dimensions refer to Figure 2-10, where h = flow depth, H = channel depth, W = channel bed width, and L = average width of fill.]

Source: Dames & Moore 1999b, Table 2

* For 0.5 ft of difference in superelevation

- C Peterson Wash Diversion.** This diversion will consist of an embankment in Peterson Wash and a channel that will run east to west upstream of the San Juan pit. The embankment structure will divert stormwater runoff into the channel on the west side of the wash. The embankment structure will be approximately 15 feet tall and will traverse the entire width of Peterson Wash. The channel length will be approximately 2,500 feet long and will be constructed in soil or rippable material.

The channel alignment for the diversion from Peterson Wash to Cottonwood Wash is shown in Figure 2-14. The channel slope varies between 1.5 to 4.0 percent and no curve reduction is anticipated. Table 2-6 provides dimensions of the energy dissipation riprap structures at locations where the channel will discharge into Cottonwood Wash as shown on Figure 2-14.

A typical cross section of the Peterson Wash diversion dam is depicted in Figure 2-15. The embankment would be 15 feet tall, constructed of impermeable material, have upstream and downstream slopes of 2H:1V and have a 15-foot crest width. The dam is designed to discharge directly into the constructed diversion channel and to have no reservoir storage.

- < **Stormwater Retention Management System.** An integrated stormwater retention management system will be used to control stormwater run-on and runoff from the leach pad and the West and East development rock stockpiles. The system will use lined collection ditches; both a lined excess process solution impoundment and a lined stormwater impoundment below the leach pad; and a series of retention dams below, within, and above the footprints of the development rock stockpiles. Stormwater collected by the leach pad perimeter ditches and the solution collection ditch will be conveyed to the excess process impoundment at the southeastern toe of the leach pad. Overflow from the excess process impoundment will be directed by an HDPE-lined overflow channel to the stormwater impoundment. These facilities were designed for the worst-case scenario of 100-year/24-hour storm event, during the period of pad development that corresponds to the potential maximum stormwater runoff (Dames & Moore 1999a).

Table 2-6. Conceptual Design Dimensions for Riprap Apron (see Figure 2-9)

Riprap Location	Design Flow Rate (cfs)	Riprap Size, d_{50} (ft)	Dissipater Pool Length (ft)	Dissipater Pool Depth, h_s (ft)	Apron Length (ft)
West Diversion Outfall at Section W5	1,776	2.0	60	4.5	25
West Diversion Outfall at Section W3	2,000	2.0	60	5.5	30
West Diversion Outfall at Section W1	2,000	2.0	60	6.0	30
South Diversion Outfall at Section SO3	799	1.5	45	4.5	25
Peterson Wash Diversion Outfall at Section P2	2,670	2.0	75	7.5	40

Source: Dames & Moore, 1999b, Table 3

- C **Stormwater Impoundment.** The stormwater impoundment is designed to have a storage capacity volume sufficient to contain both drain-down of PLS and stormwater runoff from the leach pad that would occur if there was a 24-hour power outage at the mine during a 100-year/24-hour storm event (Figure 2-16). Based on these and other conservative assumptions (such as not accounting for the availability of emergency backup generators), the storage requirement for the stormwater impoundment is 317 af plus freeboard (URS 2002b). The current design of the stormwater impoundment (390 af of storage plus 2 feet of freeboard, for a total capacity of 430 af) has not been revised to reflect the reduction in process solution flow rates estimated by PDSI in the revised MPO (20,000 gpm of total flow currently estimated compared to previous assumptions of average and total flows of 30,000 and 45,000 gpm, respectively). The final design of the stormwater impoundment may not change; however, if revised the design will still provide a minimum total containment volume for 317 af of storage plus freeboard. Based on the current design, the total surface area of the impoundment footprint is approximately 30 acres. It will be lined with a single, 60-mil, HDPE liner over six inches of 3/8-inch-minus bedding soil compacted to 95 percent maximum dry

density of standard Proctor (ASTM-698). The height of the embankment containing the impoundment will be about 10 feet above the downstream toe. A small depression approximately 20 feet deep will be constructed in the south corner of the impoundment to serve as a pump sump. The stormwater evacuation system for the impoundment will consist of a 48-inch gravity feed pipeline with a capacity of 3,000 gpm. This pipeline will convey stormwater to the SX/EW plant for use as raffinate make-up water. Table 2-7 provides design characteristics of the stormwater impoundment.

Table 2-7. Current Design Characteristics of the Stormwater Impoundment

Design Characteristic	Specification
Storage Capacity (af)	430
Total Surface Area (ac)	28
Spillway Elevation (ft-msl)	3,430
Embankment Elevation (ft-msl)	3,433
Height of Embankment Above Downstream Toe (ft)	10
Downstream Embankment Slope (h:v)	2.5:1
Upstream Embankment Slope (h:v)	3:1
Stormwater Removal Capacity (gpm)	3,000

Source: Dames & Moore 1999b, Table 4

< **Emergency Spillway.** To comply with dam safety design criteria, the stormwater impoundment’s U-shaped embankment will be constructed with an emergency spillway at the northeast corner, preventing catastrophic dam overtopping by allowing flood waters to safely exit the dam. The spillway will be a side-channel type, cut into natural ground and lined with concrete as required to prevent scour. Assuming a full reservoir, no evacuation from the impoundment, and PLS inflow of 35,000 gpm during a storm event, the spillway is designed to discharge into a natural drainage that is tributary to Talley Wash and has a minimum design capacity of the 100-year/24-hour peak outflow from the impoundment.

C Retention Dams. Retention dams are designed collect stormwater runoff from the West and East development rock stockpiles. Additional retention dams will collect stormwater runoff upstream of the West development rock stockpile. The retention dams are located in four general locations relative to the West development rock stockpile footprint: 12 dams are located upstream (R dams), 11 dams are located within the footprint (W dams), and four dams are located downstream (DP dams); four other retention dams are located downstream of the East development rock stockpile (SJ dams). The locations of the retention dams upstream of, within the footprint, and below the West development rock stockpiles are shown on Figure 2-17. The retention dams downstream of the East development rock stockpiles are shown on Figure 2-18. The dams located within the footprints of the stockpiles and pad will be removed as necessary as the stockpiles and/or pad expand over their locations. The retention dams are sized to contain the 100-year/10-day storm event without discharge. Each dam is designed with 2H:1V upstream and downstream side-slopes, and with a 15-foot crest width (see Figure 2-19 for typical cross section). Retention dam heights and storage capacities that correspond to the locations depicted in Figures 2-17 and 2-18 are summarized in Table 2-8.

The runoff volume estimated to reach each dam does not include rainfall on the top surface of the development rock stockpiles because the probability is low that the stockpiles will become sufficiently saturated to allow that water to report to the dams. Small berms will be placed, as needed, to direct runoff from the stockpile slopes to the dammed drainages. The dams will be constructed at a reasonable distance from the stockpile to avoid damage from the run-out of dumped development rock. Stormwater runoff retained behind the dams will either evaporate or seep into groundwater. None is slated for use in mining operations.

C Internal Drainage Ditch. A drainage ditch will be constructed approximately half-way along the alignment of the pad footprint to divert into Cottonwood Wash stormwater runoff that has not come into contact with mining activities. The ditch is designed to pass the 100-year/24-hour peak flow of approximately 912 cfs; this peak flow reflects the delayed flows captured in the detention dams constructed upstream. The ditch will be lined as construction of the leach pad progresses northward and will be used as a conduit for pipelines that will capture and transport PLS.

< **Other Facility Surface Water Management Systems.** Diluent, reagents, fuel, and other petroleum products used in the operations will be stored in above-ground tanks within impervious secondary containment systems to avoid possible discharge to surface waters. All tanks will have leak detection systems. Secondary containment systems will have a capacity of at least 110 percent of the volume of the largest tank contained within the secondary containment facility. Sulfuric acid will be stored in tanks located within containment structures that can be drained to other containment facilities, such as the lined leach pad or the SX/EW tankfarm runoff tank. The SX/EW plant will be designed as a zero-discharge facility, incorporating drainage design features and containment tanks. The agglomeration area and overland conveyor will incorporate a lined containment system designed to drain surface runoff to the leach pad.

Table 2-8. Design Characteristics of Retention Dams

Dam	Spillway Height (ft)	Crest Height (ft)	Storage Capacity (af)	Approximate Width of Dam Base (ft)	Approximate Length of Dam Crest (ft)
R1	23.0	25.0	27.60	120	347
R2	24.2	26.2	16.10	120	238
R3	22.9	24.9	14.70	115	198
R4	28.9	30.9	13.40	145	237
R5	34.4	36.4	14.70	165	142
R6	15.7	17.7	8.00	90	226
R7	21.6	23.6	13.10	110	137
R8	39.2	38.2	13.40	175	142
R9	20.4	22.4	10.60	105	139
R10	19.0	21.0	4.20	n/a	76
R11	26.9	28.9	14.50	130	189
R12	22.3	24.3	4.60	115	185
W1	21.2	23.2	39.70	110	485
W2	12.5	14.5	3.60	75	240
W3	24.0	26.0	17.30	120	257
W4	21.0	23.0	13.40	110	101
W5	24.0	26.0	16.50	120	111

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W6	20.3	22.3	8.60	105	94
W7	23.3	25.3	15.50	120	79
W8	24.0	26.0	22.40	120	153
W9	24.0	26.0	18.60	120	197
W10	23.4	25.4	24.80	120	267
W11	24.0	26.0	19.30	120	142
DP1	21.0	23.0	26.90	110	348
DP2	24.0	26.0	19.00	120	337

Table 2-8, continued. Design Characteristics of Retention Dams

Dam	Spillway Height (ft)	Crest Height (ft)	Storage Capacity (af)	Approximate Width of Dam Base (ft)	Approximate Length of Dam Crest (ft)
SJ1	9.0	11.0	13.80	60	81
SJ2	11.7	13.7	2.20	75	220
SJ3	23.1	25.1	7.80	120	231
SJ4	21.4	23.4	21.40	110	247

Source: Dames & Moore, 1999b, Table 5

Note: Dams constructed with spillway heights less than 25 ft and storage capacities less than 50 af are non-jurisdictional under ADWR Dam Safety Regulations. Dams with storage capacities less than 15 af are non-jurisdictional, regardless of spillway height.

2.1.2.3.3 Groundwater Protection. Project facilities are subject to the requirements of the State of Arizona’s APP Program (Arizona Administrative Code R18-9-101 through 113), and PDSI is in the process of APP application review. Proposed groundwater protection measures include use of a liner system beneath the leach pad, stormwater controls, pumping systems, tank containment systems, and other features and operations designed to meet APP requirements. Key APP rules require that, among other things:

- < PD demonstrate that the discharging facility(s) will not cause or contribute to a violation of numeric Aquifer Water Quality Standards;
- < the facility(s) be designed, constructed, and operated so as to ensure the greatest degree of discharge reduction achievable through application of Best Available Demonstrated Control Technology (BADCT), processes, operating methods, or other alternatives;
- < there be regular monitoring of groundwater quality and quarterly reporting; and
- < conceptual closure and post-closure plans describe measures to be taken to ensure continued compliance with applicable numeric Aquifer Water Quality Standards after closure of the facility(s).

PDSI has incorporated BADCT into facility designs to protect groundwater. Incorporation of BADCT design criteria demonstrates the facility(s) will be developed in a manner that achieves the greatest degree of demonstrable discharge reduction. The leach pad and excess process solution impoundment liner systems, lined storm water impoundment, septic tank systems, truckwash, sulfuric acid storage, and other facilities and operations have been designed to meet BADCT criteria.

A groundwater monitoring program to verify that numeric Aquifer Water Quality Standards are not exceeded will be incorporated into the APP. Monitoring requirements include collection and analysis of groundwater

samples from monitor wells to be installed at approved points of compliance for the mining operations. ADEQ will specify groundwater quality constituents to be monitored in the APP based on results of groundwater quality and material characterization studies.

A conceptual closure and post-closure strategy for the Project has been developed and included in the project's APP application. ADEQ requires conceptual closure strategies in the APP application that minimize stormwater run-on and infiltration and/or seepage from mine facilities that would affect aquifer water quality. In general, all potentially discharging facilities will either be closed in place or will undergo clean closure. Closure in place consists of leaving solid materials in place and, if necessary, providing a containment system that meets BADCT requirements. Possible closure in place activities include installing an infiltration-control cap or detoxifying the facility (by means of rinsing) such that further discharge is unlikely. Clean closure consists of removing and properly disposing of all liquid and solid waste, unused or recyclable chemicals, and impacted materials from the facility (including removing underlying impacted soils to appropriate industrial health- or risk-based levels). The APP closure strategy for the Project will complement the proposed reclamation plan to achieve continued compliance with applicable numeric Aquifer Water Quality Standards.

2.1.2.3.4 Waste Management. Solid waste generated at the Project will be disposed of in a manner consistent with ADEQ regulations. Solid waste will be transported off-site to an approved disposal or recycling facility. Office trash will be disposed of at the county landfill near Safford. Used petroleum products will be transported to a contracted recycling company in accordance with state and federal regulations. Nearly all scrap metal, most used HDPE pipe, and some construction debris will be recycled. Wastes determined to be hazardous under state and federal laws will be properly packaged and transported by a permitted transporter to an EPA-approved hazardous waste treatment, storage, or disposal facility. A pollution prevention plan, as required by the ADEQ, will be developed by PDSI prior to Project construction to minimize waste generation at the Project through source reduction, reuse, and recycling.

2.1.2.3.5 Hazardous Materials Storage, Handling, and Transport. Sulfuric acid, diluent, reagents, fuel, and other petroleum products used in the operations will be stored in above-ground tanks situated within impervious secondary containment systems having a containment capacity of at least 110 percent of the volume of the largest tank therein. Table 2-9 provides a list of regulated materials, the approximate on-site storage capacity, and their locations of use at the Project.

PDSI personnel handling hazardous materials will receive appropriate training that meets the applicable requirements prescribed by ADEQ, EPA, and the U.S. Department of Transportation. Additionally, employees will receive safety training required by the Mine Safety and Health Administration (MSHA) and other training prescribed by PDSI policies. PDSI will require that contractors transporting sulfuric acid or other hazardous materials to or from the Project certify that their drivers meet all the applicable training requirements prescribed by law and perform in accordance with PDSI environmental policies and safety standards.

PDSI estimates that approximately three-fourths of the daily tanker truck deliveries will arrive from the south via Highway 191 or east via Highway 70 and the remaining one-fourth will arrive from the west via Highway 70 from Globe (see Figure 2-7). Trucks arriving to the Project from the west will cross the Gila River at the Reay Lane Bridge and enter the mine site via PD Mine Road. Trucks coming from the south on Highway 191 or from the east on Highway 70 will cross the river at the Solomon Bridge and then access the Project via PD Mine Road. No tanker trucks are expected to use the existing, narrow 8th Avenue (Safford) Bridge to access the mine site in order to minimize traffic impacts in town.

2.1.2.3.6 Sulfuric Acid Storage and Transport. Sulfuric acid will be shipped to the Project in 3,500-gallon capacity tanker trucks and stored on-site in carbon steel tanks. The operations will include two 2,500-ton

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(312,500-gal) sulfuric acid storage tanks near the north end of the leach pad for acid addition in the agglomeration system and one 80-ton (10,000-gal) storage tank at the SX/EW facility to provide make-up acid to the SX plant. All three tanks will be situated in acid-resistant, concrete secondary containment facilities that can be gravity-drained to other containment areas, such as the lined leach pad and the 1.9-million-gallon stainless steel runoff collection tank located in the tankfarm.

Sulfuric acid consumption rates over the life of the Project are estimated to average about 1,600 tpd (about 200,300 gpd) during years of full production. These rates will require, on average, approximately 70 truck loads of acid per day.

Probable sources of sulfuric acid include existing copper smelting operations northwest of the Project in Globe, Arizona, or to the east at Hurley, New Mexico, where sulfuric acid is a byproduct.

2.1.2.3.7 Other Reagents. Reagents used and stored in the SX/EW area include diluent, extractant, and cobalt sulfate. These reagents will be stored in tanks located in the SX/EW tankfarm, which is designed as a containment area. It is excavated to provide required solution head to allow gravity flow piping to enter the associated tanks. Process solution bypasses and stormwater runoff are collected in the tankfarm drainage system, which incorporates the 1.9-million-gallon runoff tank located within the tankfarm.

Table 2-9. Regulated Materials to be Used and Stored at the Dos Pobres/San Juan Project

Tank Location	Regulated Material	On-site Storage Capacity*	Use
Site no. 1 explosive storage area (powder magazine)	Diesel fuel	25,000 gal	Used for blasting (fuel oil component of ANFO)
	Miscellaneous blasting materials	Various quantities of boosters, primer cord, delay caps, etc.	Used for blasting
Site no. 2 Fueling station	Gasoline	20,000 gal (two 10,000-gal tanks)	Small vehicle service
	Diesel fuel	5,000 gal	Small vehicle service
	Propane	15,000 gal	Used in water heaters and heating of offices
Sx/ew plant	Concentrated sulfuric acid (92-94%)	10,000 gal	Provides make-up acid for electrolyte
	Propane	30,000 gal (two 15,000-gal tanks)	Used in water boilers
Sx/ew plant (Ew tankhouse)	EW surfactant	264-gal totes (supplied in totes, no storage tank)	Added to electrolyte
Sx/ew tankfarm	Diluent	8,000 gal	Used in SX process
	Extraction reagent	264-gal totes (supplied in totes, no storage tank)	Used in SX process
	Cobalt sulfate pentahydrate (- 8% cobalt solution)	264-gal totes (supplied in totes, no storage tank)	Added to electrolyte
Truck shop service complex	Gasoline	20,000 gal (two 10,000-gal tanks)	Small vehicle service
	Diesel fuel	10,000 gal	Misc. vehicle service
	Anti-freeze (ethylene glycol)	23,500 gal (one 15,000-gal storage tank, one 8,500-gal mix tank)	Misc. vehicle service

Alternatives Considered

	Propane	15,000 gal	Heating and water heaters
Mine fueling station	Gasoline	20,000 gal (two 10,000-gal tanks)	Small vehicle service
	Diesel fuel	175,000 gal	Haul truck/heavy equip. service
Near crushing plant (north end of Leach pad)	Concentrated sulfuric acid (92-94%)	625,000 gal (two 312,500-gal tanks)	Acid addition in agglomeration system

Source: J. Korolsky, PDSI

* Tank storage capacity does not necessarily represent amount actually used or stored on-site.

The SX/EW tankfarm areas are provided with a concrete floor and concrete equipment bases. All tank and pump bases in the tankfarm will be covered with a PVC protective covering. To keep the organic and aqueous solutions separated within the tankfarm, all of the loaded organic tanks, diluent and extractant storage tanks, and organic processing equipment are located together in one contained area of the tankfarm. This containment area for organic solutions is equipped with a sump and pump for recovering the solutions to the holding tanks.

SX diluent will be supplied by tanker truck and stored in an 11-foot-diameter carbon steel tank located in the containment area of the tankfarm. Diluent can be pumped either to the organic mixing tanks, or directly to the SX trains. SX extractants, oxime-based chelating agents, will be supplied in 264-gal totes and stored in extraction reagent storage tanks located in the tankfarm. Each tank is equipped with a centrifugal pump for distribution to the organic mixing tanks for reagent mixing.

Cobalt sulfate pentahydrate solution will be supplied in 264-gal totes. The cobalt solution will be metered by one pump into the electrolyte recirculation tank to make up for the amount removed from the EW electrolyte inventory.

2.1.2.3.8 Fuel Storage and Distribution. Diesel fuel and gasoline will be supplied to the Project by tanker trucks. The trucks will travel directly to one of three fueling stations and offload into above-ground storage tanks that will be provided with secondary containment systems. The first fueling station, the mine fuel station, will be located south of the Dos Pobres mine, northwest of the crusher facility. It will service mine haul trucks as well as smaller vehicles. Storage tanks for this fueling station will be within a bermed area lined with polyvinyl chloride (PVC) or HDPE. A heavy equipment fuel dispensing area will be located on one side of the storage area, and a dispensing area for smaller vehicles will be located on the opposite side.

The second fuel station, servicing smaller vehicles and equipment, will be located at the truck shop complex. Storage tanks for this station will be mounted on skids and placed within a concrete containment area equipped with a sump. In addition, a steel, pre-engineered fuel, lubrication, and storage building will be placed at this site.

The third fuel station, the Mine Office Fuel Station, will be located at Site No. 2 and will only service smaller vehicles. As part of its AZPDES permit requirements, PDSI will develop a Spill Prevention Control and Countermeasures (SPCC) Plan to address requirements for preventing accidental spills of petroleum products and procedures to be followed in the event of a spill.

2.1.2.3.9 Air Resources.

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- < **Air Quality Control Permit.** The Project must and will meet all applicable state and federal air quality standards. These standards prescribe emission limits, operational practices and administrative requirements. The purpose of these standards is to ensure that emissions are sufficiently reduced so as to prevent any exceedances of health-based, maximum allowable ambient concentrations.

PDSI will utilize proven control equipment, innovative process designs, and responsible operating practices as methods to minimize air emissions. These operating practices and compliance with the terms and conditions of the permit will ensure that Project operations are in compliance with applicable air quality standards. The following sections discuss control measures to be implemented to minimize emissions from Project activities and processes.

- < **Crushing and Material Handling Dust Control System.** Dust control for the crushing and material handling system will be accomplished by a combination of dust collection and suppression applications by specific area. These methods are described below. Refer to the crushing and material handling system flow diagram (Figure 2-2) for additional information.

- < **Primary Crushing Plant.** Each side of the truck dump pocket will have fog nozzles located in the pocket. The fog nozzles will be activated by a proximity sensor to control dust formation as each haul truck unloads into the primary crusher.

Dust-laden air will be filtered and exhausted from the crusher discharge box, from the belt feeder discharge chute, and at the tail end of the coarse ore conveyor. The system will include an air pulse, baghouse dust collector and will be sized to exhaust approximately 18,000 standard cubic feet per minute (scfm). Cleaned air will be exhausted to the atmosphere via an exhaust fan. Collected dust will be discharged to the crusher discharge conveyor and sprayed with water.

- < **Coarse Ore Surge Pile.** Two water-wetting systems will be installed for dust control and suppression at the discharge point of the primary crushing discharge conveyor (CV-001) to the coarse ore surge pile. The first system will pre-wet the ore stream on CV-001 before it discharges onto the coarse ore surge pile. The second system will control fine material at the discharge point with a ring spray header installed around the discharge ore flow stream. This dual-wetting system will control dust formation before the crushed ore falls onto the surge pile. Each reclaim belt feeder will have fog nozzles installed at the hooded discharge to the coarse ore conveyor to control dust formation.

- < **Secondary and Tertiary Crushing and Screening Plant.** Fog nozzles will be provided at two locations above the secondary and tertiary crushing surge bins, one at the discharge chute of the feed conveyor (CV-003) to the secondary bin and the second at the tripper conveyor (CV-011) discharge to the tertiary bins.

Two 45,000-scfm pulse-type baghouses (DC-005 and DC-007), one at each end of the building, will control dust generated from all material handling facilities within the plant.

The first baghouse unit (DC-005) will provide dust collection and suppression for:

- C 3 surge bins reclaim feeders (BF-009, BF-011, and BF-013)
- C 2 primary screens (SC-003 and SC-005)
- C 1 secondary screen (SC-007)
- C 2 secondary crushers (CR-003 and CR-005)

- C 1 tertiary crusher (CR-007)
- C 3 conveyor transfer points (CV-005, CV-013, and CV-015)

The second unit (DC-007) will provide dust collection and suppression for:

- C 4 surge bin reclaim feeders (BF-015, BF-017, BF-019, and BF-021)
- C 4 secondary screens (SC-009, SC-011, SC-013, and SC-015)
- C 4 tertiary crushers (CR-009, CR-011, CR-013, and CR-015)

Additionally, a smaller 10,000-scfm baghouse will be used to control dust at the conveyor transfers located outside the plant, which include CV-007, CV-009, and CV-015.

- < **Fine Ore Surge Pile.** The fine ore stockpile will include an enclosure structure. Fog nozzles will be provided above the enclosed fine ore stockpile to suppress dust generated as the final product discharges onto the pile. A 10,000 scfm baghouse (DC-016) will be provided at the fine ore stockpile enclosure to collect dust generated from the incoming volume of material and air to minimize dust emissions from the enclosure.

Fog nozzles will be used to suppress dust at each of the three belt feeders (BF-023, BF-025 and BF-027) in the fine ore reclaim tunnel.

- < **Agglomeration and Stockpile Stacking.** A 10,000-scfm baghouse (DC-015) will control dust at the splitter box which transfers ore from the fine ore reclaim conveyor (CV-019) to the two agglomerator feed conveyors (CV-021 and CV-023).

Acid and water are added to the ore as it is fed into the agglomeration drums, raising the moisture content of the material to a range of six to eight percent moisture. When the ore is agglomerated in the drums the fine particles adhere to the larger rocks. Due to the increased moisture content and agglomerated condition of the ore when it exits the drums, no additional dust suppression is needed after the agglomeration process.

- < **Tankhouse Acid Mist Suppression.** During the electrowinning process, oxygen liberated from the electrolyte solution at the face of the anode forms small bubbles which rise through the solution. As the bubbles reach the surface, they release droplets of sulfuric acid solution immediately above the cell. Some droplets coalesce and settle back into the cell, while others become suspended in the air in the form of a fine mist. A portion of the acid mist eventually settles out elsewhere in the tankhouse; however, some of acid mist may exit the building through openings in the tankhouse roof or sides.

Acid mist that is generated in the tankhouse from electrowinning processes will be controlled with the use of a combination of passive control systems. Control methods currently being evaluated include:

- C **Heat-retention beads (HRBs).** These small plastic devices form a floating layer of insulation on top of the cell that helps reduce heat loss from the electrolyte. The floating layer of beads also serves to coalesce the droplets generated by the bursting bubbles, significantly reducing the amount of mist that becomes airborne.

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- C **Surfactants.** These specialized chemicals modify the surface tension of the electrolyte at the surface of the cell, effectively altering the way bubbles form and burst. This action reduces the amount of mist that is generated.
 - C **Foggers.** PDSI is currently evaluating the practicability and effectiveness of water fogging systems for reducing acid mist emissions. Water sprays are typically used to control sulfate buildup above electrowinning cells. Very fine water mist spray systems (fogging systems) above the cells are being evaluated to determine if they would also be effective in controlling acid mist by creating a saturated zone immediately above the cell where droplets of acid would coalesce and settle back into the cell.
 - C **Cell brushes.** Cell brushes are plastic or fiber devices that attach to the anodes above the surface of the electrolyte. The cell brushes serve to coalesce the mist droplets such that the droplets eventually fall and are reabsorbed into the electrolyte. PDSI is currently testing cell brushes to determine if operational problems associated with the devices can be overcome.
- < **Volatile Organic Compounds (VOCs).** Emissions of volatile organic compounds (VOCs) result from the combustion or evaporation of certain organic compounds, such as petroleum-based fuels, solvents, and diluents. The primary source of VOC emissions at the Project is expected to be the evaporation of diluent used in the solution extraction process. Diluent is a highly refined petroleum product that is used as a carrier for the viscous copper extraction reagent. Together these products comprise the organic solution used in the SX process. Typically, the organic solution contains about 90 to 95 percent diluent and 5 to 10 percent copper extraction reagent.
- The emissions of VOCs from SX process tanks will be minimized through engineering designs and reagent selection. Solution extraction mix boxes will be totally enclosed and settling tanks will be constructed with enclosures extending beyond the organic weirs.
- PDSI will evaluate various diluents available from different manufacturers in order to select a product that will meet operational requirements and have a sufficiently low vapor pressure such that evaporation losses are minimized.
- < **Fugitive Particulate Emissions from Roads.** Fugitive particulate (dust) emissions from haul roads and unpaved primary access roads will be controlled by the application of water and, in certain areas, commercial dust suppressants. Water trucks will be employed 24 hours per day, as needed, to water haul roads and major access roads.
- < **Boiler Combustion Gases.** Boilers will be used at the SX/EW facility to heat water which will then be used to heat electrolyte to improve electrowinning efficiency. Combustion gases will be generated by the burning of fuel in the boilers. Emissions of regulated pollutants from the boilers will be minimized through the use of clean-burning fuels, such as propane and/or natural gas.

2.1.2.4 Closure and Reclamation Measures

In addition to the conceptual closure plan submitted in its APP application, PDSI prepared and submitted a reclamation plan to the BLM (PDSI 2003). This plan was developed to meet both federal and state reclamation requirements. The reclamation measures presented in the plan were intended to achieve productive post-mining land uses (PMLU) as required by both federal and state regulations. Types of PMLUs envisioned for the project area include 1) wildlife habitat and limited grazing; 2) recreation, tourism, and

education; 3) industrial development; 4) future mineral exploration and mine development; and 5) management of environmental resources including visual, air, water, and soil. The long-term reclamation objectives of the Dos Pobres/San Juan Project Reclamation Plan are listed below.

- < Establish wildlife habitat at selected facilities including the development rock stockpiles, borrow sites, and locations where buildings and other structures are removed.
- < Provide scenic overview location(s) in the mining district that support education and tourism for people traveling in the area, thereby, enhancing the economic base of Graham County and addressing visual and recreation resource values.
- < Protect public health and safety by controlling access to certain mining facilities, such as the open pits, through proper management of access roads, fencing, and gates.
- < Provide the basis of an expanded commercial and industrial complex (e.g., a small industrial park) during mining and post-mining by utilization of existing infrastructure (e.g., truck shop).
- < Anticipate future mineral exploration and development as technologies advance which may support the reprocessing of stockpile material, and mining of material below the current ore cut-off grade.
- < Maintain access to recreation resources near and adjacent the project area to the extent practicable while protecting the safety of recreational users.
- < Implement interim and concurrent reclamation and drainage control programs to facilitate long-term stabilization and closure requirements.
- < Coordinate reclamation activities with requirements of the Arizona Department of Environmental Quality's APP Program to efficiently meet the collective reclamation and closure requirements including management of process materials.
- < Establish stable slopes and appropriate vegetation ground cover using native plant materials as described in PDSI's reclamation plan.

Reclamation of surface disturbance within the project area will be an ongoing component of Project operations. Interim reclamation and testing programs, such as revegetation on the pad side slopes, will help to identify practicable and effective reclamation techniques for concurrent reclamation efforts and development of long-term strategies. Interim programs will focus on the reduction and prevention of erosion through implementation of drainage stabilization and erosion control programs, and a program involving selective contouring and seeding of surface disturbances associated with Project construction, such as peripheral areas around buildings, areas adjacent to roads, soil stockpiles, etc. Revegetation will involve application of a native seed mix as Pure Live Seed. Species planned for use (and average pounds of seed to be applied per acre) are Western honey mesquite (1), fourwing saltbush (2), side-oats gramma (2), foxtail fescue (2), desert needlegrass (1), and purple threeawns (2). This seed mixture was developed by Phelps Dodge in cooperation with the BLM Safford Field Office, the Natural Resources Conservation Service, and the University of Arizona Agricultural Research Center (PDSI 2003). Revegetation will not necessarily be limited to these plant species; PDSI will continue to evaluate other plants that may be suitable to meet revegetation requirements. Success of revegetation efforts will be demonstrated by establishment of a diverse native vegetative cover that retains soils and encourages wildlife habitat establishment. Success criteria for revegetation will be self-sustaining (without irrigation for not less than three years) vegetation at not less than 70 percent of the average densities

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of native species on the area itself as measured prior to disturbance or on adjacent undisturbed areas. If density measurements demonstrate that initial revegetation has been unsuccessful in meeting this criterion, additional hydroseeding may be employed until it is demonstrated that revegetated areas are self-sustaining (no supplemental irrigation) and with suitable cover. It is anticipated that revegetation success to meet both BLM and Arizona State standards will be demonstrable in not less than three successive growing seasons. To lessen the potential spread of noxious and invasive plants, PD will ensure that all soil, seed, and vegetative material will be removed from earth-moving equipment prior to the equipment being transported to the mine site. Concurrent reclamation and testing activities will be implemented at selected mining units, including portions of the leach pad and development rock stockpiles as they become permanently inactive. Primary elements of the reclamation plan are summarized below and discussed in greater detail in the Dos Pobres/San Juan Reclamation Plan submitted to the BLM (PDSI 2003).

2.1.2.4.1 Public Safety. One of the primary objectives of BLM regulations and the Arizona State Mined Land Reclamation Act is to ensure public safety. The following measures will be implemented prior to and during reclamation to reduce or eliminate potential hazards within disturbed areas after mine closure: 1) construction of physical barriers such as fences, berms, and rocks; 2) placement of warning signs; 3) stabilization of slopes; 4) demolition of unneeded buildings; and 5) proper disposal of debris.

When practical, physical barriers will be constructed around open pits to restrict public access. Standard four-strand barbed wire safety fences will be constructed around most of the pit perimeter and six-foot-high chain link fencing will be placed along sections of the open pits that are accessible to public traffic, including designated public overlooks and other areas adjacent to public roads.

The final configurations of leach pad and development rock stockpiles are characterized by geotechnically and erosionally sound slopes (SRK Consulting 1998). The non-uniformity of particle sizes of the ROM-sized material results in a filtering or packing effect which naturally limits erosion. While the overall slope design of the leach pad is expected to minimize erosion in areas composed of crushed ore, PDSI will evaluate these areas during leach operations to determine if other erosion mitigation measures are necessary. The final configuration of the leach pad has been determined to be geotechnically stable under static and pseudo-static conditions (ibid).

While pit wall stability during mining is mandated by Mine Safety and Health Administration (MSHA) regulations, the design of economic pit slopes does not always result in the long-term stability of the inter-bench pit walls following mine closure. Following mine closure it is expected that the inter-bench walls will gradually ravel and deposit small rock-falls on benches. The accumulation of these small rock-falls will, over time, gradually produce talus slopes at an angle of repose for the material.

Some buildings and ancillary facility structures will remain after completion of the mining operations for use as part of the industrial PMLU, future mining PMLU, and long-term environmental monitoring required by the Arizona APP Program. Areas where buildings are removed will be reclaimed to eliminate hazardous conditions and achieve PMLU objectives.

2.1.2.4.2 Leach Pad. At closure, the leach pad will be allowed to drain to remove residual process solutions, consistent with APP requirements. To achieve the PMLU of wildlife habitat and limited grazing, the following measures will be implemented:

< In the course of operations, PDSI will construct stormwater diversions and management systems.

- < The top surfaces of each of the last lifts of the leach pad will be graded after leach operations cease to direct the flow of stormwater to the center of the top lifts of the leach pad, where it will be collected to control infiltration (Figure 2-20). Designated ponding areas will be compacted and/or capped to minimize infiltration and enhance evaporative loss.
- < The entire top surface area of the leach pad will be covered with approximately 12 inches of Basin Fill sediment or comparable growth media and seeded with native species. PDSI will evaluate opportunities for salvaging state-protected plants such as barrel cactus as part of Project development activities. If plants are salvaged, their use as part of reclamation activities would also be evaluated.
- < A test program will be undertaken concurrently with mine operations to determine the optimum method for reclamation of the leach pad side-slopes. To maintain an overall side-slope of 2H:1V, setbacks averaging approximately 20 feet wide will be made following the placement of approximately every second lift. The revegetation test program will involve rinsing the surface of the flat area of the setback and outer slope with fresh water to remove residual salts. Following rinsing, the flat area of the setback will be capped with approximately 12 inches of Basin Fill sediment or comparable growth medium and seeded with native species. A minimum of 12 inches of similar growth medium will be placed on the side-slopes of each lift and hydroseeded with a BLM-approved native seed mix. This test program could potentially begin during Year 3 of the operation. Monitoring of the test program will determine optimum, concurrent reclamation methods, and optimum growth media thickness to achieve revegetation goals.

2.1.2.4.3 Development Rock Stockpiles. The following reclamation measures will be implemented to support the wildlife habitat and limited grazing PMLUs planned for the development rock stockpiles.

- < In the course of operations, PDSI will construct stormwater diversions and management systems.
- < The top surfaces of the development rock stockpiles will be graded during final placement of material to minimize random ponding and infiltration, to direct stormwater flows to compacted areas within the interior of the surface area for collection and evaporation, and to arrive at the final configuration. The top portions of slopes will be crown chained or dozed to stabilize slope faces.
- < The entire top surfaces of the stockpiles will be revegetated and capped with approximately 12 inches of Basin Fill sediment or comparable growth medium and seeded with native species. As a general rule for acceptable reclamation for both BLM and Arizona State requirements, revegetation has to be self-sustaining for a reasonable period such that it is obvious that the vegetation is surviving without irrigation, generally not less than three successive growing seasons. Also, it is a goal of the revegetation efforts that revegetated areas will have similar plant densities as the adjacent undisturbed areas.
- < Growth medium will be used extensively on the side-slopes of the stockpile for revegetation purposes. In addition, the stockpile slopes will be broadcast seeded, hydroseeded, or hydromulched. PDSI will evaluate opportunities for salvaging state-protected plants such as barrel cactus as part of Project development activities. If plants are salvaged, their use as part of reclamation activities would also be evaluated.

2.1.2.4.4 Open Pits. Revegetation of pit areas would interfere with potential future mining opportunities in the Mining District and is therefore not proposed. The open pit areas will be maintained for possible future access to mineral resources. Management of these areas will be in accordance with the PMLU of future mineral exploration and mine development in addition to education and tourism. Public access to the open

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pit areas may be allowed under controlled circumstances as part of the education and tourism PMLU objective. Visitor information center(s) will be developed to support tourism and to enhance awareness of mining and the history of the Mining District through educational displays.

Through time, a pit lake is expected to develop in each of the open pits. As documented in Chapter 4, water quality within the pit lakes is expected to be satisfactory and specific remedies or reclamation activities are not anticipated to be necessary.

2.1.2.4.5 Roads and Traffic. The post-reclamation configuration of roads has been designed to meet the access requirements for future industrial uses, education, and tourism uses, maintenance and security functions, and environmental monitoring. Roads that are retained as part of PMLU objectives will have public access controls (i.e., gates) for safety purposes, will be reduced in width as appropriate, and will be maintained in accordance with designated PMLUs. Approximately 300 acres of access and haul roads (excluding areas within the pits) will exist at the project site upon closure. Paved roads will be retained and maintained for long-term site access.

The following reclamation measures will be employed for access roads:

- < For roads that are reclaimed, slopes on both sides of the roadway will be graded to blend in with the surrounding terrain. Where possible, drainages will be established to provide stable drainage conditions. Typical sediment barriers will be placed in accordance with BLM standards.
- < After contouring and grading are completed, ripping of road surfaces and scarifying of the underlying materials will be performed to a depth ranging from one or two feet to reduce compaction and to prepare a seed bed. The prepared roadbeds will then be seeded with native species.
- < Public access will be discouraged by the placement of earth berms, boulders, or gates at roadways around the site. Appropriate signage will be placed at all retained roads to provide warning of potential hazards associated with unauthorized access.

The following reclamation measures will be employed for haul roads:

- < Haul roads will be reduced in width to allow two-way traffic of standard vehicles to access the former stockpile areas for PMLU management. Reclaimed portions of haul roads will be contoured and graded to control direct surface drainage. Safety berms that have been constructed will be retained along the outside edges of retained haul roads as necessary to ensure safety.
- < After contouring and grading are completed, ripping of road surfaces and scarifying of the underlying materials will be performed to a depth ranging from one to two feet to reduce compaction and to allow for revegetation through natural colonization.

2.1.2.4.6 Reclamation Costs and Bonding. The estimated grand total for reclamation costs for the Project is \$10,992,000 (2003 dollars), of which \$9,926,000 is the estimated cost for the proposed reclamation measures and \$1,066,000 is the estimated cost for closure requirements identified for PD's Aquifer Protection Permit (PDSI 2003). Ongoing maintenance costs during the period of reclamation will be funded through the 10 percent contingency added to the estimated total reclamation cost. These costs are summarized in Table 2-10.

Table 2-10. Projected Closure and Reclamation Cost Summary for the Dos Pobres/San Juan Project

Mine Facility	Projected Cost (2003\$)
Leach Pad Surface	826,000
Leach Pad Slopes	1,806,000
Development Rock Stockpiles	1,689,000
Development Rock Stockpile Slopes	702,000
Process and Support Facilities	509,000
Haul and Access Roads	91,000
Open Pits	217,000
Support and Miscellaneous	397,000
Subtotal Reclamation Cost	6,237,000
	624,000
Contingency @ 10% of Reclamation Cost	
Insurance @ 1.5% of Total Labor	20,000
Performance Bond @ 1.5% of Reclamation Cost	94,000

Table 2-10, continued. Projected Closure and Reclamation Cost Summary for the Dos Pobres/San Juan Project

Mine Facility	Projected Cost (2003\$)
BLM Administration @ 17.8% of Reclamation Cost	1,110,000
BLM Indirect Costs @ 18.0% of Reclamation Cost	1,123,000
Subtotal Indirect Costs	3,689,000
TOTAL RECLAMATION COST	9,926,000
APP Closure Costs	1,066,000
GRAND TOTAL RECLAMATION & CLOSURE COSTS	\$10,992,000

Source: PDSI 2003

In consultation with BLM and the State Mine Inspector, PD will select an appropriate financial assurance mechanism(s) for reclamation costs. Potential financial assurance mechanisms include any one or a combination of the following: surety bond, cash, irrevocable letter of credit, certificate of deposit or savings accounts, securities or bonds, or insurance.

2.1.2.5 Projected Employment

The Project will provide both short-term construction employment and long-term employment in the form of direct employment by PDSI, local contractor employment in direct support of project operations, and local indirect employment (jobs created or maintained as a result of direct employee needs for goods and services).

During the 15-month construction phase, employment is expected to average approximately 470 full-time workers, with peak employment reaching about 980 workers during the eighth month of construction. Table 2-11 summarizes estimated construction employment and payroll for this short-term phase of the Project.

Table 2-11. Estimated Employment and Payroll for the 15-Month Construction Phase of the Project

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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Total Employment (FT jobs)	150	220	400	450	570	800	890	980	960	600	320	270	220	170	50
Estimated Payroll (\$000s)	538	789	1435	1614	2044	2869	3192	3515	3443	2152	1148	968	789	610	179

Source: PDSI 1996

For the operational phase of the Project (16 years), approximately 250 full-time employees, with an average annual per-capita salary of \$36,000 (1997 dollars) plus benefits, will be employed annually by PDSI. It is expected that roughly 80 percent or more of the positions would be filled by applicants residing in the local Graham and Greenlee counties area, including some PD employees currently working at PD's Morenci Mine.

PDSI estimates that local contractors will employ approximately 100 people to provide direct support services for the Project. A portion of these contractors will work onsite at the Project while the remainder will provide certain maintenance and fabrication services out of local shops. Because of the Project's proximity to the San Carlos Apache Reservation, employment opportunities for tribal members will be available through both direct employment and through contractors that may be located on the reservation. Estimated total payrolls for local contractors working at or for the Project range from \$2.5 to \$3.0 million annually.

2.1.3 Partial Backfill of San Juan Alternative

This alternative to the Proposed Action was identified in the 404(b)(1) Alternatives Analysis (see Alternative C in Appendix A) as practicable, which is defined as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR §230.3[q]). This alternative would preclude development of additional leach ore resources at the San Juan pit assuming future conditions (economics, technology, etc.) would otherwise result in more economic reserves on the fringes of the currently planned pit. The mine plan for this alternative is described below and depicted in Figure 2-21.

2.1.3.1 Mining and Ore Processing Operations

This alternative is identical to the Proposed Action for mining production and pit configuration and sizing except that the portions of the San Juan pit would be partially backfilled with roughly 60 to 80 million tons of development rock from both the San Juan and Dos Pobres pits starting in Year 10 of the Project (see Figure 2-21). The backfilled development rock would be placed on the upper benches on the mined-out west side of the pit, starting at about the 3,650-foot elevation bench and rising to about the 4,150-foot elevation in two lifts. The stockpile would ultimately cover roughly 141 acres in the pit. The ultimate pit lake elevation is projected at the 3,300-foot elevation and is therefore not expected to contact the backfilled material (Water Management Consultants 2002). Placing a portion of the development rock in the San Juan pit, while not a usual and customary mining practice, would reduce the heights of the East and West development rock stockpiles by approximately 50 feet, to 4,200 and 4,100 feet above msl, respectively, with relatively minor reductions in the footprints of the development rock stockpiles. Drilling and blasting procedures would be identical to the Proposed Action alternative.

This alternative does not propose backfilling of the Dos Pobres pit, as the distribution of oxide ore reserves and the known sulfide ore resource precludes full or partial backfilling at this pit. Therefore, the Partial Backfill

alternative also proposes the 1,300-foot setback around the Dos Pobres pit to allow for potential future mining of deeper sulfide ore.

All ore processing facilities and operations, such as crushing, leach pad construction and operation, and SX/EW operations, would be identical to those described in the Proposed Action alternative.

2.1.3.2 Support and Ancillary Facilities

Support and ancillary facilities and operations, such as water supply, electrical power, compactible soil borrow source, shops, communications, transportation, access and haul roads, site security, powder magazine, and aggregate materials facilities, would be identical to those described in the Proposed Action alternative.

2.1.3.3 Environmental Protection Measures

Environmental protection measures involving wastewater treatment, surface water management, groundwater protection, solid waste and hazardous materials management, and air quality would be identical to those described in the Proposed Action alternative.

2.1.3.4 Closure and Reclamation Plan

The post-mining land uses for this alternative are the same as those proposed for the Proposed Action alternative. The closure and reclamation plan for this alternative would be similar to that described in the Proposed Action alternative. Development rock backfilled into the San Juan pit would be stabilized and reclaimed in a fashion similar to that proposed for the West and East development rock stockpiles. The closure and reclamation costs are expected to be the same as the Proposed Action alternative.

2.1.3.5 Projected Employment

The Partial Backfill alternative would require the same levels of direct and indirect employment as projected for the Proposed Action during the construction and operational phases of development. Backfilling of development rock into the San Juan pit would occur simultaneous with mining in other portions of the pit and is not anticipated to require additional haul trucks or employment.

2.1.4 No Action Alternative

The No Action alternative in this Mine Plan Alternatives Set would involve denying all federal actions being analyzed in this set: BLM would reject the proposed MPO and the Partial Backfill alternative; the COE would deny PDSI a Section 404 permit. The result would be no authorized MPO and no issuance of a federal permit for mining activities subject to Section 404 of the Clean Water Act. This alternative would effectively result in no mining at the Dos Pobres/San Juan Project.

The No Action alternative is a NEPA requirement that serves as a baseline for comparing and evaluating the environmental consequences of the Proposed Action and project alternatives. However, for the BLM, the No Action alternative in this set is not consistent with BLM's authority under the General Mining Law of 1872, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; the Mining and Mineral Policy Act of 1970; and the National Materials and Minerals Policy, Research, and Development Act of 1980. These laws and regulations authorize a mining claimant to explore for, extract, and process the mineral resources on public lands in a manner consistent with applicable state and federal laws and regulations. In evaluating

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whether to approve an MPO, the BLM, as a public lands manager, has the responsibility under FLPMA and 43 CFR 3809 to ensure that:

- < proposed mining operations include adequate provisions to prevent unnecessary and undue degradation of the environment (as defined in 43 CFR 3809.0-5);
- < measures are included to provide for reclamation of disturbed land; and
- < proposed operations would comply with other applicable federal and state laws and regulation.

The BLM thus disallows proposed mineral development activities on public lands if the activities would violate applicable state and federal regulations and/or BLM standards. In such cases, BLM indicates the changes in the proposed mining activities that would allow for approval of the plan. Under the current laws, BLM does not have the authority to deny an otherwise adequate or reasonable Mining Plan of Operations (i.e., selection of the No Action alternative is precluded because BLM typically works with the applicant to develop an acceptable MPO).

.1.5 Mine Plan Alternatives Eliminated from Further Consideration

2.1.5.1 Mine Plan Alternatives Considered in 404(b)(1) Alternatives Analysis

An analysis of alternatives is required by the COE under guidelines established under the Clean Water Act, Section 404(b)(1) (40 CFR 230). The objective of this analysis is to identify the least environmentally damaging, most practicable alternative for the Project that avoids or minimizes impacts to waters of the U.S. A copy of the 404(b)(1) alternatives analysis completed for this project is provided in Appendix A.

A total of 15 alternatives or alternative mine plan components were considered in the alternatives analysis, including 9 alternative mine plan configurations, 2 site development sequence alternatives, 2 compactible soil borrow source alternatives, and 2 SX/EW location alternatives. Of the nine configuration alternatives and two site development sequence alternatives considered, only two alternative mine plan configurations (Alternative C, *Partial Backfill of San Juan Pit*, and Alternative I, *Single Leach Pad/Crush Convey w/ Haul Truck Placement* [the Proposed Action alternative]), were found to be practicable in light of cost, technical, and logistic considerations. These two alternatives were carried forth for further analysis in this EIS. The seven mine plan alternatives eliminated from further study were determined to be impracticable for logistic reasons and/or cost considerations (see Table 4 in Appendix A). These alternatives and the reasons for their elimination from further consideration are described in Appendix A.

The alternatives considered in the COE's 404(b)(1) Alternatives Analysis represent a reasonable range of mine plan alternatives that exist to achieve the Project's purpose and need and are technically capable of being accomplished. Considering the constraints imposed by the orebodies, the distribution of other ore reserves in the project area, and the nature and distribution of waters of the U.S. in the project area, it is unlikely that other practicable alternatives that meet the purpose and need and that significantly minimize or avoid impacts to waters of the United States could be developed.

2.1.5.2 Alternative Mine Plan Elements Considered but Eliminated

Alternatives to some elements of the mining plan of operations were considered in preliminary planning and feasibility phases but eliminated from further analysis due to logistical or technical reasons. These alternative elements and the reason(s) for their elimination are described below.

2.1.5.2.1 Alternative SX/EW Plant Location. In the early planning phases of the Project, PD considered locating the SX/EW Plant in a central area with regard to PD's long-term potential development of their holdings within the Safford Mining District. Called the East SX/EW Plant, this site is located about 2.5 miles south-southeast of the San Juan pit in the east half of Section 13 (T6S, R26E) on PDSI's patented Lone Star property. The East SX/EW Plant would receive copper-laden pregnant leach solution (PLS) delivered through stainless steel and HDPE pipelines from the PLS collection tank at the toe of the leach pad. Plant feed and raffinate pipelines approximately four miles long would be constructed along a common corridor that would parallel the haul road to the Lone Star compactible clay borrow source. The pipeline system would be designed as a zero discharge system.

Given the time horizon for PD's long-term development plans at this time within the Safford Mining District, the uncertainties of environmental permitting, and the high capital and operating costs associated with the PLS and other pipelines to an East SX/EW Plant, this alternative was eliminated from further consideration at this time.

2.1.5.2.2 Alternative Supplemental Water Source. As a partial alternative to groundwater pumping, PDSI investigated the possibility of using treated effluent from the City of Safford as a supplemental source of process water for the Project. The City of Safford currently operates a wastewater treatment plant that processes about 875,000 gallons of effluent per day (D. Gordon, Chief, Water and Reclamation Plant Operations, Gila Resources, pers. comm., 10/24/02). The treated wastewater is currently used to irrigate the City-owned golf course.

PDSI has not included the use of effluent in its current Project development plans because it has not been determined whether it is feasible or economic to transport the volume of effluent available from the new plant, which is located south of the Gila River, to the project area. Furthermore, it is unknown whether effluent water quality would be suitable or compatible for use in the leaching and SX/EW process. Without this information, no agreements can or have been made to purchase the City's effluent at this time. Since this alternative is not available at this time and may not be available in the future, it is not considered further in this EIS; however, PD will continue to evaluate this option as more data become available.

2.1.5.2.3 Off-Site Mine Alternative. PD considered two off-site mine alternatives in its 404(b)(1) Alternatives Analysis (see Appendix A): mining of the Sanchez orebody under the currently approved MPO (USDI BLM 1992) and mining of the Lone Star ore deposit. The Sanchez Mine alternative was determined to be not practicable due to various technological considerations requiring the need for further evaluation of the current engineering design, metallurgical data, and hydrogeologic regime. The Lone Star Mine alternative is not practicable at this time because of the limited information available upon which to prepare a mine plan and determine project feasibility. As geologic exploration studies to characterize the Lone Star orebody and its extent are still ongoing, this mine project is conceptual only.

2.2 LAND EXCHANGE ALTERNATIVES SET

Only the BLM can act on the alternatives presented in this set. Although PD's original proposed project was a land exchange and not an MPO, PD has extended the exchange proposal as an alternative to BLM authorizing the proposed MPO. By selecting a land exchange alternative, BLM would relinquish its jurisdiction over mining on public lands. Within this set of alternatives to the Project, one land exchange alternative has been identified by the BLM for detailed analysis.

Federal land exchange packages consist of public lands desired by the proponent (the selected lands) and private lands being offered to the federal agency in exchange (the offered lands). Land exchanges are discretionary and voluntary actions; that is, the BLM is not obligated to process every exchange proposal it receives (43 CFR 2200.0-6). Generally, BLM will respond to a land exchange proposal if it 1) conforms with the land tenure objectives of applicable BLM resource management plans; and 2) has the potential to serve the public interest. The regulatory and realty considerations that circumscribe the range of reasonable land exchange alternatives that were developed and considered for this Project are briefly explained below.

2.2.1 Considerations in Formulating Land Exchange Alternatives

Several considerations played a role in BLM's development of land exchange alternatives. Among them are the public interest objectives and equal value requirements under FLPMA and FLEFA, BLM's resource management objectives, and constraints on the configuration of selected and offered lands from which to develop alternatives. These considerations as they shaped how land exchange alternatives were formulated for this Project, are briefly described below.

2.2.1.1 Equal Value

Federal Land Exchange Facilitation Act (FLEFA) and 43 CFR 2201.6 require that the lands being exchanged be of equal value, meaning that the monetary value of the offered and selected lands must be equal. To achieve this, any difference in monetary values, up to 25 percent of the value of the public lands leaving federal ownership (selected lands), must be equalized through a cash payment by the exchange proponent or by the agency. This requirement ensures that the exchange is fair, despite potential acreage differences, since not all land is worth the same dollar amount per acre.

2.2.1.2 Public Interest and Resource Values

That an exchange be in the public interest is a requirement under Federal Land Policy Management Act (FLPMA), FLEFA, and 43 CFR 2200.0-6. In considering whether an exchange is in the public interest, FLPMA directs the Secretary to “give full consideration to better federal land management and the needs of State and local people, including needs for lands for the economy, community expansion, recreation, areas, food, fiber, minerals, and fish and wildlife...” (FLPMA Section 206[a]).

In addition, Section 206(a) of FLPMA also requires that the values of, and the management objectives served by, the lands being acquired (the offered lands) be greater than, or at least equal to, the values of and management objectives served by the public lands being disposed of (the selected lands). This means that the resource values of the lands the BLM would acquire be equal to or greater than the values of the lands leaving public ownership. In meeting the public interest requirement, the authorizing officer must generally determine that the values of the resources being exchanged are comparable or are in the public’s favor in terms of quantity or quality.

2.2.1.3 Mutual Agreement on Configuration of Exchange Lands

Since federal land exchanges are discretionary, both the BLM and the exchange proponent must agree to the configuration of the selected and offered lands. The considerations affecting the configuration of selected and offered lands are briefly described below.

2.2.1.3.1 Selected Lands. Previous decisions by the Interior Board of Land Appeals (IBLA) have defined the range of alternative exchange configurations the BLM must consider. In *124 IBLA 44 (August 26, 1992)*, the IBLA determined that “in conducting an environmental review of a proposal to exchange public for private land, *BLM need not consider the alternative of conveying other land if it is not desired by the private party involved in the exchange and conveyance of such land would not satisfy the purpose of the exchange*” (emphasis added). Thus, the range of alternative selected lands is restricted to those configurations that are mutually acceptable to the exchange proponent and BLM.

2.2.1.3.2 Offered Lands. For this alternative set, any offered lands package had to meet one constraint: properties that PD originally offered to BLM in 1994 must be included as a “base package.” At BLM’s request, the base package was reduced from seven to five of the original properties to provide BLM more flexibility in considering and developing alternative offered lands packages. All five base properties are lands within Long-Term Management Areas (LTMA)¹⁴ identified in the Safford District RMP, as amended, Map 27. These LTMA are the Gila Box Riparian National Conservation Area (RNCA); the Dos Cabezas LTMA; and the Las

¹⁴ Long-Term Management Areas are areas in which the BLM would like to maintain its long-term management presence.

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Cienegas National Conservation Area (NCA)/Sonoita Valley Acquisition Planning District. The five base properties have been appraised by BLM at \$1,463,000 and are described in Section 2.2.3.

To develop offered lands packages that met BLM's resource value and land management objectives and that was within 25 percent of the dollar value of the selected lands, PD made nine additional offered properties available to BLM. These properties are located within areas administered by the Safford Field Office, as well as in other BLM field offices, and were identified by BLM as desirable for public ownership. The BLM members of the ID Team then developed and considered seven land exchange packages (see discussion of these alternatives in Section 2.2.4). Of these, BLM resource specialists identified one land exchange action alternative, which is described below in Section 2.2.2, as the most desirable alternative.

2.2.2 Land Exchange Alternative

Under this alternative, the BLM would dispose of approximately 16,297 acres of selected lands, both surface and mineral estate, north of Safford, including public lands containing the Sanchez office building. In exchange, BLM would acquire a total of 3,867 acres of private lands, both surface and mineral estate, composed of five base package properties (2,135 acres) and six optional properties (1,732 acres). Table 2-12 summarizes the total acres and appraised values of the selected and offered lands.

The exchange includes the transfer of all the rights and privileges, including surface water rights, that are appurtenant to the selected and offered lands and owned by the BLM and PD, respectively. The exchange of both selected and offered lands would be subject to existing rights-of-way and easement agreements; when those expire, the new landowner could decide whether or not to renew or renegotiate the agreement. Prior to the exchange, current grazing leases on both the selected and offered lands would be terminated; however, BLM would likely offer the current leasee first right of refusal for those offered properties acquired by BLM on which grazing will be allowed by the applicable resource management plan. Similarly, PD has indicated that if the exchange is authorized, it would renegotiate grazing leases with the current allottees for portions of the selected lands not directly involved in the proposed Dos Pobres/San Juan Project.

In developing this alternative, the BLM sought to maximize the management benefits and maintain a diversity in the resource values of lands that would come into federal ownership while minimizing the discrepancy in appraised dollar values between the selected and offered lands. Resource values associated with this offered lands package that would come into public ownership and federal management include, but are not limited to, riparian and wetland habitats; wildlife; threatened and endangered species habitats; cultural resources; recreation; public lands access to special management areas; and public land consolidation.

A description of the selected and offered lands and the foreseeable uses of the lands as identified by PDSI and applicable BLM land use and resource management plans, respectively, is provided below as required by 40 CFR 1508.7 and 1508.8. The foreseeable uses provide the context for analyzing the anticipated impacts of the land exchange alternative in Chapter 4.

Table 2-12. Summary of Acreages and Appraised Values of Selected and Offered Lands in the Land Exchange Alternative

Parcel	Acres	Total Value
<i>Offered Lands (Private Lands)</i>		
<u>Base Package</u>		
Amado	180	\$59,000.00
Curtis	755	\$208,000.00
Musnicki	640	\$360,000.00
Schock	240	\$420,000.00
Feulner	320	\$416,000.00
<u>Optional Package</u>		
Tavasci Marsh	324	\$1,625,000.00
Freeland	140	\$57,200.00
Butler-Borg	308	\$114,000.00
Norton	400	\$120,000.00
Clyne I	160	\$240,000.00
Clyne II	400	\$600,000.00
Total Offered	3,867	\$4,219,200.00
<i>Selected Lands (Public Lands)</i>		
Total Selected	16,297	\$3,958,500.00
<i>Difference/Discrepancy</i>	12,430 acres in favor of PD	\$260,700 in favor of BLM (6.5% discrepancy)

2.2.2.1 Description and Foreseeable Uses of Exchange Lands

2.2.2.1.1 Selected Lands. PD has selected approximately 16,297 acres of BLM-administered public lands (selected lands) located north of Safford in Graham County in the Safford Mining District (see Figure 1-2) for exchange. The selected lands include 190 acres of the San Juan ore deposit that lie on public lands and 14.36 acres of public lands north of the town of Sanchez containing an approximately 6,500-square-foot office building constructed by the AZCO Mining Company for the Sanchez Mine project. The Sanchez parcel is located about eight miles southeast of the San Juan pit north of the Gila River. The selected lands are encumbered by 844 mining claims, all held by PD. Two inholdings are excluded from the selected lands. One is an approximately 628-acre parcel, comprising 40 mining claims held by the Melody Claims Group. This parcel would remain under BLM management. The second is the patented Horseshoe Claims, a private inholding within the selected lands that would remain under current land ownership. The appraised value of the selected lands is \$3,958,500, which includes valuation of the mineral potential of the selected lands, including those portions of the San Juan deposit on public lands. Photographs of the selected lands are provided in Figure 2-22; legal descriptions of these lands are provided in Appendix B.

2.2.2.1.2 Foreseeable Uses. The potential future uses of the lands after an exchange are referred to in this document as “foreseeable uses.” The foreseeable uses of the selected lands can be differentiated into two general groups by their different stages of planning. The first group includes the specific mining and mining-related support activities described in detail under the Proposed Action alternative (see Figure 2-1) which would directly impact approximately 1,931 acres of the public lands selected for exchange. In addition, PDSI will continue to use the office building and other facilities located on the Sanchez parcel for activities related to mining support, including mine process technology research.¹⁵ These foreseeable uses would be implemented upon approval of the land exchange or MPO and all necessary permits.

The second group of foreseeable uses describes future mining or mining-related support activities that are still conceptual but anticipated for the potential future development of the Dos Pobres sulfide orebody and the Lone Star orebody (Figure 2-23). If future feasibility studies indicate that it is technically and economically feasible to do so and assuming all necessary permits and authorizations are secured for each project, PDSI anticipates that it could initiate mining of the Dos Pobres sulfide orebody and could start development of its Lone Star mine toward the end of the Dos Pobres/San Juan Project (PDSI 1996). At this time, PDSI has developed only preliminary conceptual plans for development of the sulfide orebody and the Lone Star deposit based on the limited exploratory and geological data collected to date. These conceptual plans include three kinds of foreseeable uses for the selected lands that would be involved in these potential projects: production operations and support areas; transition areas; and intermittent use areas. The kinds of activities anticipated for each of these foreseeable use categories are described below and the approximate acreage each category comprises are summarized in Table 2-13.

Land Ownership	Dos Pobres Sulfide		Lone Star		Intermittent	SUB-TOTAL	DP/SJ Project	TOTAL
	POS	Trans.	POS	Trans.				
BLM	630	133	1,100	223	12,280	14,366	1,931	16,297
PD Private	2,829	489	4,749	296	9,848	18,211	1,429	19,640
TOTAL	3,459	622	5,849	519	22,128	32,577	3,360	35,937

- < **Production Operations and Support Areas (POS).** Anticipated mining activities in this area include open pit mining; crushing, leach pad, and development rock stockpiling; tailings impoundment development; soil stockpiling; mining support activities (shops, plants, etc.). Facilities in this area would include haul roads, borrow areas, and processing facilities like an SX/EW plant and/or concentrator. Potential surface disturbance could affect 26 to 100 percent of the land within this foreseeable use category. This category comprises 1,713 acres of the selected lands.
- < **Transitional Areas.** This area was arbitrarily set as a 100-yard-wide safety buffer zone surrounding Production Operations and Support areas. Foreseeable uses in Transition Areas include access roads, safety berms, and run-out areas for stockpiles. Together, transitional areas for both potential

¹⁵ PDSI is conducting these activities at the Sanchez parcel under the authorization of the approved Sanchez Copper Project Mine Plan of Operations (USDI BLM 1992a).

projects would impact about 364 acres of the selected lands, of which approximately 6 to 25 percent of the land surface within this use category would be disturbed by these activities.

- < **Intermittent Use Areas.** This area includes all other public lands in the project area that would not be developed for the Dos Pobres/San Juan Project and not identified as Production Operations and Support Areas or Transition Areas. This area comprises roughly 12,921 acres (76 percent) of the selected lands. Potential primary uses of this area include environmental monitoring and spatial buffers between production facilities and project area boundaries for maintenance of site security. Use of the former administration building on the Sanchez parcel for ongoing mine support and technology research is included in this category (USDI BLM 1992b). Anticipated levels of surface disturbance within the Intermittent Use area range from zero to five percent of the land surface.

2.2.2.1.3 Offered Lands and Their Foreseeable Uses. The total offered lands package consists of 11 private properties totaling 3,867 acres. Figure 2-24 shows the regional locations of the offered lands within the state. The base properties are the Amado, Curtis, Musnicki, Schock, and Feulner properties, which total 2,135 acres. The remaining six properties included in the package consist of Tavasci Marsh, Freeland, Butler-Borg, Norton, Clyne I, and Clyne II properties, which total 1,732 acres. Together, the 11 properties have been appraised at \$4,219,200.¹⁶ Photographs of the offered properties are provided in Figures 2-25 and 2-26. Each property and its foreseeable use per applicable federal management/land use plans are briefly described below; legal descriptions are provided in Appendix B. More detailed information about the resources of each property is provided in Chapter 3, the Affected Environment.

- < **Amado Property.** This 180-acre property held in two tracts is located on Bonita Creek within the boundaries of the Gila Box RNCA in Graham County (Figure 2-27). Both tracts straddle Bonita Creek. This property is one of 15 remaining private inholdings in the Gila Box RNCA, which lies within the BLM's Safford Field Office boundaries. The property is currently leased for grazing; no residential improvements or other structures have been built on the property. The southerly tract abuts the Curtis property.

If acquired by the BLM, the entire Amado property would be incorporated into the Gila Box RNCA, as it lies within the congressionally approved boundary. This property would be managed in a manner consistent with the management prescriptions described in the Final Gila Box Management Plan (BLM 1998). As stated in the Final Plan, general management objectives for the Gila Box RNCA, which was designated by Congress under the Arizona Desert Wilderness Act of 1990, Title II, are to conserve, protect and enhance its riparian areas and associated resources. Currently, the Gila Box RNCA is withdrawn from mineral entry.

- < **Curtis Property.** This 755-acre property, also held in two tracts, is located on Bonita Creek. All but approximately 80 acres of the southern tract lie within the congressionally approved boundaries of the Gila Box RNCA in Graham County. Both tracts straddle Bonita Creek and are located just downstream of the Amado property (Figure 2-27). The northern tract of the Curtis property includes a five-acre area that is excluded from the proposed exchange; the landowner that PD bought this property from has retained this five-acre exclusion area as private land. The Curtis property is one of 15 remaining private inholdings within the Gila Box RNCA. The property is currently leased for grazing and contains some range improvements; no residential improvements or other structures have been built on the property.

¹⁶ BLM updated the appraisals, originally made in 1995-1997, in 1999.

If acquired by the BLM, 675 acres of the 755-acre Curtis property would be incorporated into the Gila Box RNCA and would be managed in a manner consistent with the management prescriptions described in the Final Gila Box Management Plan (BLM 1998). As stated in the Final Plan, general management objectives for the Gila Box RNCA, which was designated by Congress under the Arizona Desert Wilderness Act of 1990, Title II, are to conserve, protect and enhance its riparian areas and associated resources. Currently, the Gila Box RNCA is withdrawn from mineral entry. The remaining 80-acre portion of the Curtis property, which is not within the Gila Box RNCA boundary but directly adjacent to it, would be managed according to the decisions in the Safford District RMP, as amended, which call for multiple use including but not limited to livestock grazing, wildlife habitat, dispersed recreation, public access, and mineral entry.

- < **Musnicki Property.** This 640-acre property abuts the northeast boundary of the Dos Cabezas Mountains Wilderness in Cochise County (Figure 2-28); to its north lies the Peterson property, which was acquired by BLM as part of the Morenci Land Exchange (BLM 1996b). The property includes the abandoned Musnicki ranch house, the former headquarters of the Nine-Mile Ranch. This property is currently leased for grazing.

If acquired by the BLM, this property would help to consolidate BLM holdings in the Dos Cabezas LTMA and improve public access to the Dos Cabezas Mountains Wilderness, especially to the central portion of the Wilderness. The property would be administered by the Safford Field Office according to the decisions in Safford District RMP, as amended, which states that lands within the LTMA are to be managed for their multiple resource values as defined in FLPMA. General management objectives for other BLM lands in the Dos Cabezas LTMA include livestock grazing, recreation, wildlife habitat, mineral entry, and other uses. Off-highway vehicle use would be limited to existing roads and trails. The existing Musnicki Ranch House would be left intact but not specially managed.

- < **Schock Property.** This 240-acre property is located in Santa Cruz County, east of Sonoita at the base of Mt. Bruce at the northern end of the Mustang Mountains (Figure 2-29). The property lies within the BLM's Sonoita Valley Acquisition Planning District and borders the newly created Las Cienegas NCA. The property is currently grazed; no residential improvements or other structures have been built on the property.

If acquired by the BLM, this property would be administered by the BLM's Tucson Field Office. It would be incorporated into the Las Cienegas NCA as would any land contiguous with the NCA acquired by the BLM, and be managed per the objectives of the Las Cienegas NCA RMP, on which an ROD was issued in July 2003 (BLM 2003). Specifically, the approved RMP 1) identifies which roads will be open to motorized vehicle travel; 2) authorizes the continuation of valid leases, grants, and permits through their expiration dates, including livestock grazing and utility rights-of-way; 3) closes public lands in the NCA to locatable and leasable mineral exploration and extraction; 4) establishes recreation opportunity zones and an Empire-Cienega trail system; 5) provides for hunting, as authorized by the State of Arizona; 6) applies existing federal and state laws pertaining to the protection of fish, wildlife, vegetation, and cultural resources to the public lands in the NCA; 7) closes certain roads to motor vehicle travel in erosion-prone areas; 8) provides for suppression of natural and human-caused wildfire after first ensuring public safety and property protection; 9) allocates periodic ranger patrols to the NCA to investigate violations of federal law; and 10) specifies management direction for numerous other land and resource management issues in the NCA. Currently, 95 percent of public lands in the Las Cienegas NCA are closed to mineral location and mineral leasing.

- < **Feulner Property.** This 320-acre property is located in Pima County about one mile east of Cienega Creek in BLM's Sonoita Valley Acquisition Planning District, about one mile outside the boundary of the Las Cienegas NCA. The property straddles an unnamed drainage that is tributary to Cienega Creek (Figure 2-30). The property is currently leased for grazing; no residential improvements or other structures have been built on the property.

If acquired by the BLM, the Feulner property would be administered by the BLM's Tucson Field Office. It would remain within the boundary of the Sonoita Valley Acquisition Planning District and, like all BLM holdings in that District, be managed per the objectives of the Las Cienegas NCA RMP. It would not, however, be incorporated into the NCA because it does not abut the Las Cienegas NCA boundary. The Feulner property would be managed similarly to the Schock property.

- < **Tavasci Marsh Property.** This property consists of approximately 324 acres in sections 15 and 22 of Township 16 North, Range 3 East, near Clarkdale, in Yavapai County, Arizona. The offered property is the site of the Tavasci Marsh Habitat Restoration Project, a cooperative effort between Phelps Dodge Corporation and the Arizona Game and Fish Department. The property, which includes Tavasci Marsh and some surrounding uplands (Figure 2-31), is not grazed and is currently managed by AGFD under a cooperative management agreement with Phelps Dodge for public recreation, fish, wildlife, and wetland habitat (Phelps Dodge Corporation and Arizona Game and Fish Commission 1990 — Agreement and Amendment of Agreement for Show Low Lake and Tavasci and Packard Ranch Riparian Areas). The property actually lies within the congressionally approved boundary of the Tuzigoot National Monument (Section 3.3.2.1.1 provides an explanation of the relationship of this property to the existing Monument boundary) and is adjacent to the Tuzigoot Pueblo ruins.

If acquired in the exchange, the National Park Service (NPS), which administers the Tuzigoot National Monument, would manage the Tavasci Marsh property. The NPS would continue to follow the management objectives set forth in an existing Cooperative Management Agreement signed by PD and AGFD (G. Henderson, NPS, personal communication, July 10, 1997) but may also undertake other management actions consistent with the *Tuzigoot Statement for Management* (US NPS 1995). One of the objectives of the Monument's management plan is to acquire the Tavasci Marsh property since it "currently separates the Monument from Dead Horse Ranch State Park [which] precludes joint development for public use of the Marsh" (ibid., p. 13). The following general management objectives would apply to the Tavasci Marsh property: preserve the historic and prehistoric integrity of the Monument and surrounding lands, maintain the environmental integrity of the Monument, and retain the native vegetative community (ibid.). This property would not be open to mineral entry.

- < **Freeland Property.** This property consists of three separate tracts (West, North, and East) totaling 140 acres north of the Dos Cabezas Mountains Wilderness in Cochise County (Figure 2-32). The West tract is 20 acres in size and is adjacent to the Stewart Trust property, which was acquired by BLM as part of the Morenci Land Exchange (BLM 1996b). The North tract is 80 acres and the East tract is 40 acres. All tracts fall within the Dos Cabezas LTMA. The property is currently leased for grazing and contains no residential structures.

Foreseeable management and authorized uses of this property under this alternative would be identical to that described for the Musnicki property.

- < **Butler-Borg Property.** This 308-acre property abuts the boundary of the Dos Cabezas Mountains Wilderness in Cochise County (Figure 2-32). Although located outside of the Wilderness, this

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property, together with the Freeland West tract and the Stewart Trust property included in the Morenci Land Exchange, provide public and physical access to the central part of the Wilderness. If acquired, this property would help consolidate BLM holdings in the Dos Cabezas LTMA. The property is currently leased for grazing and contains no residential structures.

Foreseeable management and authorized uses of this property under the land exchange alternative would be identical to that described for the Musnicki property.

- < **Norton Property.** This 400-acre property is held in two tracts and is located within the floodplain of Black Rock Wash in Graham County (Figure 2-33). Formerly part of the Norton family ranch, these tracts are surrounded by BLM-administered lands, are currently leased for grazing, but do not contain any residential structures. They fall within the Southwest Gila Valley LTMA.

If acquired through the exchange, BLM's Safford Field Office would manage this property per the Safford District RMP, as amended. Current management objectives for the Southwest Gila Valley LTMA include public access, livestock grazing, wildlife, mineral entry, and dispersed recreation.

- < **Clyne I Property.** This 160-acre property is located in Pima County within the Tucson Field Office's Sonoita Valley Acquisition Planning District and bordering the Las Cienegas NCA (Figure 2-34). Formerly part of a 240-acre property originally offered for the Morenci Land Exchange, this 160-acre portion (SW1/4, Section 10, T19S, R18E) was removed from that exchange to reduce the Morenci offered lands values to match those of the selected lands. PD has made this remaining 160-acre portion of the property available for this land exchange alternative. The Clyne I property straddles the middle portions of Bear Spring Canyon below Blacktail Spring and is currently leased for grazing. The property contains no residential structures.

This parcel would be incorporated into the Las Cienegas NCA and the management and foreseeable use of this property would be identical to the management described for the Schock property.

- < **Clyne II Property.** This 400-acre property is located in Pima County approximately 0.75 mile south of the Clyne I property and straddles Mud Spring Canyon (Figure 2-34). It falls within the Tucson Field Office's Sonoita Valley Acquisition Planning District, about one mile outside the boundary of the Las Cienegas NCA. A large unnamed stocktank lies in the southwest corner of the property within Mud Spring Canyon. The property is currently leased for grazing and is not encumbered by any residential or other leases; it contains no residential structures.

Like the Feulner parcel, this parcel would not be incorporated into the Las Cienegas NCA, however, the foreseeable use of this property would be identical to the management described for the Feulner property.

2.2.3 No Land Exchange Alternative

This is the second alternative in the Land Exchange Alternatives Set and involves BLM rejecting the exchange and retaining the selected lands under public ownership and federal management. Likewise, the offered lands would remain in PD's private ownership and the public would not acquire any of the resources associated with those properties.

Retaining the selected lands under BLM administration would result in a requirement for further BLM action on whether to authorize the proposed MPO or another alternative or select the No Action alternative in the

Mine Plan Alternatives Set. Under this alternative, impacts to the human environment are expected to be the same as those described under either the Proposed Action alternative or the Partial Backfill alternative. This conclusion is based on the following: 1) PDSI has submitted a Mining Plan of Operations (MPO) to the BLM for authorization, and 2) under 43 CFR 3809, the BLM authorizes any mining plan that: a) includes adequate provisions to prevent unnecessary and undue degradation of the environment; b) includes measures to provide for reclamation of disturbed land, and; c) complies with other applicable federal and state laws and regulations. It is reasonable to assume that, since the submitted MPO and the Partial Backfill alternative are also being evaluated by the COE as part of Clean Water Act permitting, that these alternatives or some modification of either will fulfill these three requirements. Therefore, it is reasonable to assume that mining activities would proceed on portions of the selected lands whether the proposed land exchange is approved or not.

2.2.4 Land Exchange Alternatives Considered but Eliminated

BLM developed and considered other alternatives to the proposed land exchange alternative discussed above, including alternative methods of acquiring the offered lands. This section briefly describes these alternatives and provides BLM's rationale for not considering them further.

2.2.4.1 Alternative Configurations of Selected and Offered Lands

The range of exchange alternatives is limited to some extent by the exchange process itself, which requires that the dollar values of the selected and offered lands be equal.¹⁷ Because land exchanges are discretionary actions, the BLM goes forward with an analysis of the exchange proposal only when the package of lands is mutually agreeable to both parties. The exchange alternative considered and analyzed in this EIS reflects offered and selected land packages mutually agreed upon by the BLM and PD.

No alternative selected lands configurations were considered because the selected lands are heavily encumbered by PD-owned mining claims; have been identified for disposal in the Safford District RMP, as amended (BLM 1994); and the proposed land ownership boundaries would simplify the current public and private land ownership pattern in the Safford Field Office.

To arrive at mutually-agreed upon land exchange alternatives, BLM undertook a process to develop and evaluate various alternative offered lands packages within the constraints of the five base and nine optional offered properties. BLM developed seven alternative offered lands packages that represent a reasonable range of alternatives which had the potential to meet the public interest requirement of FLPMA and were within the 25 percent allowable discrepancy in dollar values between the selected lands and offered lands (base plus optional) packages. The BLM members of the Interdisciplinary Team then ranked each alternative from 1 to 7 (1 being most preferred; 7 being least preferred) based on resource values that would be acquired and resource management considerations. Individual rankings were then summed to become a "score" for each alternative. The lower the total score, the more preferable the alternative to the ID Team. Based on this total score, a single alternative, Alternative 6, clearly stood out from all other land exchange alternatives as the one most preferred by the BLM members of the ID Team from a resource and management perspective. BLM determined that only this alternative would be carried forth for analysis. Alternative 6 is the land exchange alternative described in Section 2.2.5 and includes six of the nine optional offered lands, in addition to the five base properties.

¹⁷ An exchange is considered to be of equal monetary value if the cash value of the offered lands is within 25 percent of the cash value of the selected lands (FLPMA, 90 Stat.2756, 43 USC § 1716 §206[b]). Discrepancies up to 25 percent are then equalized by a cash payment to make up the difference.

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The seven land exchange alternatives developed by the BLM, their individual total scores, and their acreage and appraised values are summarized in Table 2-14. The three optional offered properties which were not included in the land exchange alternative (Lehner Ranch, Davison, and Lincoln Ranch) are described in Appendix E, along with a brief description of BLM's foreseeable uses had they been included in a land exchange alternative preferred by the BLM.

2.2.4.2 Alternative Land Tenure Adjustment Methods

Alternative methods of adjusting federal land ownership, such as direct purchase/sale or acquisition by donation instead of a land exchange, were considered by BLM but eliminated from further consideration. Section 203 of FLPMA provides for sales of public land by competitive bidding, by modified competition, or direct sale with no competition. All sales must comply with at least one of the following sale criteria as stated in Section 203 of FLPMA: "1) difficult or uneconomic to manage, 2) needed for an important public objective, or 3) acquired for a specific purpose and no longer needed for that purpose." The Safford District RMP, as amended, states that disposal of federal land by exchange is the preferred method. Because the disposal of the selected lands by sale may not fall under one of these three criteria, because exchange is the BLM's preferred method of disposal, and because PD has not offered to sell their private lands to BLM, a sale was not considered further. Furthermore, the BLM's ability to buy the offered lands directly is limited by budget constraints, and funds for purchasing all but one the offered lands are not available at this time nor will be in the foreseeable future.¹⁸ Acquisition of the offered lands by donation was eliminated from further consideration since PD has not proposed this and wishes to receive lands of equal value to those they propose to exchange with the BLM.

2.3 PREFERRED ALTERNATIVE

The BLM's preferred alternative is the land exchange alternative. This alternative would allow the BLM to achieve its objectives for public lands management and land tenure adjustments as stated in the Safford District RMP, as amended, while still meeting the purpose and need for the proposed Dos Pobres/San Juan Project. Under this alternative, federal oversight of the Project is still provided by the COE's direct involvement; the State Mine Inspector's Office would take jurisdiction over reclamation of the mined private lands. Although the selected lands would become privately owned by PD under this alternative, potential future mining projects on these lands would still be subject to COE's federal jurisdiction through its permitting authorities under the Clean Water Act. Furthermore, other federal laws such as the Clean Air Act would also likely trigger federal involvement in such future activities.

The COE, as a cooperating agency, will select the least environmentally damaging, practicable alternative as its preferred alternative. The EPA, also a cooperating agency, delegated authority for Section 402 compliance to ADEQ in December 2002, and has no permit to issue for this project.

2.4 COMPARATIVE SUMMARY OF ENVIRONMENTAL IMPACTS OF ALTERNATIVES

Table 2-15 concisely summarizes each alternative's direct, indirect, and cumulative impacts for the issues raised during scoping and for critical elements whose consideration is required by BLM NEPA guidelines. Like

¹⁸ The only offered property that is currently authorized for purchase using LWCF monies is the Lehner property, which lies within the San Pedro RNCA.

Chapter 4, the information in Table 2-15 is organized into two alternative sets: the Mine Plan Alternatives Set and the Land Exchange Alternatives Set. Both sets include separate “no action” alternatives (the No Action alternative and the No Land Exchange alternative) as well as the action alternatives. The basis for this summary is the analysis of direct, indirect, and cumulative impacts presented in Chapter 4.

Table 2-14. Summary of Seven Land Exchange Alternatives Formulated for the Dos Pobres/San Juan Project

All alternatives include the base package of lands plus the optional properties identified in column 2. Amounts in parentheses for Dollar Discrepancy column are negative, meaning the value of offered lands is greater than the value of selected lands; under these alternatives, BLM would owe the difference to PD (or PD has the option to donate this amount). Rank is the cumulative score given by BLM ID Team members; the lower the score, the more the BLM preferred the alternative.

Codes for resource values are: rip=riparian, wet=wetlands, t&e=listed species, rec=recreation, con=consolidation, wsr=Wild & Scenic Rivers, pw=perennial water, sprnca=San Pedro mca, tuzigootnm=Tuzigoot National Monument, dcmw=Dos Cabezas Mountains Wilderness, svad=Sonoita Valley Acquisition Planning District, rawhidemw=Rawhide Mountains Wilderness

Alternative	Optional Properties Included in Alternative	Total Acres (Base + Optional)	Total Appraised Value (Base + Optional)	Dollar Discrepancy w/Selected Lands	Percent Discrepancy	Associated Resource Values (excluding base package lands)	Total Score/Rank
Alt 1	Tavasci, Lehner, Clyne I, Freeland, Butler-Borg, Norton	3,518	\$3,757,200	\$201,300	5.1%	rip, wet, t&e, sprnca, access, tuzigootnm, rec, svapd, con	42
Alt 2	Tavasci, Lehner, Clyne I, Clyne II, Norton	3,470	\$4,186,000	(\$227,500)	(5.7%)	rip, wet, t&e, sprnca, svapd, rec, con, pw, tuzigootnm	43
Alt 3	Tavasci, Lehner, Clyne I, Clyne II, Freeland	3,219	\$4,123,200	(\$164,700)	(4.2%)	rip, wet, t&e, sprnca, svapd, access, tuzigootnm, rec, con	31
Alt 4	Tavasci, Lehner, Clyne II, Freeland, Butler-Borg, Norton	3,758	\$4,117,200	(\$158,700)	(4.0%)	rip, wet, t&e, sprnca, pw, access, rec, con, svapd, dcmw, tuzigootnm	27
Alt 5	Tavasci, Clyne I, Freeland, Butler-Borg, Davison	3,495	\$4,182,200	(\$223,700)	(5.7%)	rip, wet, t&e, rec, con, pw, access, dcmw, svapd, tuzigootnm	40
Alt 6	Tavasci, Clyne I, Clyne II, Freeland, Butler-Borg, Norton	3,867	\$4,219,200	(\$260,700)	(6.6%)	rip, wet, t&e, rec, con, pw, access, dcmw, svapd, tuzigootnm	14
Alt 7	Tavasci, Lincoln, Clyne II	3,861	\$4,318,000	(\$359,500)	(9.1%)	rip, wet, t&e, rec, con, pw, wsr, rawhidemw, svapd, tuzigootnm	55

Table 2-15. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
LAND USE						
Access/ Recreation	No direct, indirect, or cumulative impacts to access to and recreation on public lands. The status quo would be maintained.	Public access on San Juan Mine Road would be discontinued; Johnny Creek Ride permit could not include public lands used for mining for public safety and site security concerns; five existing BLM special use permits would be modified to exclude use of proposed mining areas; public lands available for hunting in AGFD Hunt Unit 28 reduced by about 5,169 acres (acreage that will be fenced off around Project). Access to Gila Mountains and Johnny Creek would still be available through Solomon Pass Road, a portion of which would be upgraded to mitigate for the loss of public use of the San Juan Mine Road to access the Gila Mountains.	Direct and indirect impacts are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing public access or recreational uses of the offered or selected lands. However, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	In disposing of selected lands, physical and public access to and dispersed recreation on the selected lands would no longer be controlled by BLM, but by PDSI. BLM would retain access on portions of Salt Tank Trap Rd, Solomon Pass Rd, and West Ranch Rd for continued public and physical access through PD lands to Gila Mountains and Gila Box RNCA. Owners of Horseshoe Claims would have access to their lands through BLM easement on spur road from Solomon Pass Rd. Foreseeable uses at DP/SJ Project would result in same impacts to public access and recreation as the Proposed Action. Foreseeable mining uses at DP sulfide and Lone Star projects would not be expected to further affect dispersed recreation opportunities or public access than those effects described above.	Through acquisition of offered lands, public access to the Dos Cabezas Mountains Wilderness, in the Gila Box RNCA, and in the Empire-Cienega RCA would be improved. Developed recreational facilities at Tavasci Marsh come into public ownership and management; dispersed recreational opportunities would be increased in BLM Safford and Tucson Field Offices.
Encumbrances	No direct, indirect, or cumulative impacts on existing rights-of-way or easements on public lands.	Seven ROWs are directly impacted by proposed mining and would be relocated to provide utilities to the Project. This is not expected to be an adverse impact as existing ROWs are for utilities to current or past mining operators.	Direct and indirect impacts expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing encumbrances on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts to encumbrances on the selected lands as disposal of 16,297 acres of selected lands would be subject to conditions of existing ROWs. Physical impacts from foreseeable uses would be identical to those described under the Proposed Action, but these are not expected to be adverse.	No direct, indirect, or cumulative impacts to existing encumbrances on offered lands as exchange is "subject to" conditions of existing legal agreements appurtenant to the lands.
Agriculture/ Grazing	No direct, indirect, or cumulative impacts to prime farmlands or to grazing are expected.	No direct impacts to agricultural lands, but minor indirect, long-term impacts to agricultural production through implementation of Alternate Year Fallowing Program for water resources mitigation (see Appendix F). Eight range improvements within four allotments, comprising a total of 5,169 acres of public lands would be directly impacted by proposed mining as these resources would be fenced off for security and safety purposes. BLM's grazing receipts reduced by about \$144/yr resulting from 107 AUM reduction in BLM stocking capacity within the allotments affected by this alternative.	Direct and indirect impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing agricultural or grazing practices on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts to agricultural lands. Disposal of the selected lands would adversely and directly impact 16,297 acres of public lands in 6 BLM allotments, totaling 653 AUMs. This would reduce BLM grazing receipts by nearly \$882/yr and impact 24 range improvements. In the short-term, some grazing use of the selected lands outside the proposed security fence would occur, as PD would lease back a portion of the selected lands until such time as other foreseeable uses at the DP sulfide and Lone Star projects were implemented. At that time, PD would likely terminate grazing use on additional, but unknown areas within the selected lands in order to develop these projects. The maximum total physical impacts by foreseeable uses would be about 10,431 acres. The majority of intermittent use areas could still be grazed, but PD would own the land and receive the annual grazing income that currently is paid to BLM.	Acquisition of offered lands and the availability of those lands for grazing (except Tavasci Marsh and riparian areas of Amado and Curtis) would offset slightly the loss of public grazing use of selected lands. Foreseeable uses of the offered land under public management would not affect agricultural uses or productivity.
Mineral Rights	No direct, indirect, or cumulative impacts to mineral rights on public lands are expected. This alternative would not affect PD's ability to mine its claims under a permissible MPO.	No direct, indirect, or cumulative impacts to PD's or third-parties' mineral rights on public lands are expected.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts are expected as a result of this alternative.	PD's acquisition of the selected lands would extinguish their mining claims filed with BLM, as they would now own the selected lands on which their claims had been filed. No direct, indirect, or cumulative impacts to Melody or Horseshoe claims from this alternative.	PD would relinquish right to extract minerals on offered lands. Public acquires right to extract mineral resources on Norton, Musnicki, Freeland, and Butler-Borg properties per applicable management plans. All other offered properties would be withdrawn from mineral entry if acquired through the exchange.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
LAND USE						
Blasting Noise/Vibrations	No direct, indirect, or cumulative impacts to existing levels of noise and vibrations in the region from this alternative because no blasting would occur.	In Safford, daily short-duration noise and vibration impacts from mine blasts would not reach levels commonly considered to be annoying; these impacts would last the life of the Project (16 years). The effects will be almost imperceptible at Mt. Graham and are not likely to affect astronomical observation activities.	Direct and indirect impacts are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing noise levels on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No impacts on existing noise and vibration levels in Safford as a result of the land exchange itself. The foreseeable mining at the DP/SJ Project would have impacts identical to those described under the Proposed Action. Noise and vibrations generated by the foreseeable uses at the DP sulfide and Lone Star projects would continue those impacts and be similar in magnitude to those of the Proposed Action alternative, but the number of blasts per day may vary.	No direct, indirect, or cumulative impacts to existing noise and vibration levels on the offered lands are expected as a result of the exchange.
Hazardous Materials	No direct, indirect, or cumulative impacts expected from hazardous materials as a result of this alternative. The zipACIDS site would remain and no additional hazardous material would be brought on site.	There would be a beneficial effect from elimination of the San Juan zipACIDS site as a result of the Project. Through environmental compliance with MSHA, OSHA, RCRA, EPCRA, and other regulations for hazardous materials, all regulated materials are expected to be transported, handled, stored, and disposed of properly; however, a risk of environmental damage is incurred by the transport of such materials and their presence on site (due to human error, etc). USFWS has concurred with BLM in their Biological Opinion that risk of impacts from acid spills on Gila River and listed species is minima and unlikely to have adverse effects. As part of mine closure and reclamation, many facilities would be razed and materials disposed of at an authorized waste disposal site.	Direct and indirect impacts are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to the state of hazardous materials on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Disposal of the selected lands would reduce federal liabilities for any hazardous materials associated with mined lands. In implementing the foreseeable uses on private lands, PD, as the new landowner, would assume responsibility for reclamation (with oversight from the State Mine Inspector) and proper treatment of hazardous materials associated with mining operations as required by MSHA, OSHA, RCRA, EPCRA, and other regulations for hazardous materials. Implementing the foreseeable uses would entail risks of environmental contamination associated with transporting, handling, and storing hazardous materials needed for mining. USFWS has concurred with BLM that impacts to Gila River and listed species from increased risk of acid spills is unlikely to have adverse effects.	No direct, indirect, or cumulative impacts expected. Acquisition of the offered lands would not increase federal liabilities for hazardous materials as no known such sites have been identified on the offered lands.
Visual Resources	No direct, indirect, or cumulative impacts to public lands visual resources. The visual character of the area would be retained.	Visual character of the landscape will be permanently modified in a major way, primarily through changes in topography and creation of contrasting land forms, lines, and contrasting colors of disturbed areas with undisturbed areas. Visual impacts from in-town views probably will be less noticeable as compared to views from above or near the higher elevations of the Gila Mtns. Slightly increased nighttime lighting in the project area will be a long-term effect but is not expected to impact observations at Mt. Graham as PDSI will comply with Graham County Nighttime Lighting Ordinance and use of conveyor will reduce need for haul truck lighting and headlights. The Proposed Action alternative and mine-related Reasonably Foreseeable Future Actions (RFFAs) will contribute cumulatively to visual impacts to the northern-facing viewsheds of the Safford Valley.	For in-town views of the project area, this alternative will result in similar but slightly reduced direct visual resource impacts as a result of slightly lower stockpile heights. Nighttime lighting impacts may also be slightly reduced due to portable light plants located below surface elevation in the San Juan pit for the latter part of the Project. Otherwise all impacts would be identical to those described for the Proposed Action.	This alternative would not, in itself, cause changes to existing visual resources on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	In disposing of the selected lands, BLM VRM objectives for those lands would no longer apply. The foreseeable mining uses could be implemented without BLM input on visual mitigation measures. Foreseeable uses at the DP/SJ Project would result in impacts identical to those described for the Proposed Action alternative. Foreseeable uses at DP sulfide and Lone Star projects would extend those impacts, adding to cumulative visual impacts in the Safford Valley. Together, the foreseeable mining uses would alter the landscape of the Gila Mountains and its southern flank, affecting the silhouette of Lone Star Mountain. The massing effect of the three mines across the base of the Gila Mountains would create a zone below the horizon of large-scale, mesa-like or terrace-like forms, with various structures, roads, and contrasting colors visible from the Safford Valley.	Offered lands would become subject to public management of visual resources per VRM objectives for adjacent public lands as stated in the applicable management plan for each property.
PHYSICAL RESOURCES						
Climate	No direct, indirect, or cumulative impacts on climate would result from this alternative.	Direct impacts to localized wind patterns at a microclimatic scale due to permanent changes in local topography on the project area as a result of mining activities would be imperceptible outside of the project area.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing climatic conditions; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts on climate on a local or regional scale. Foreseeable uses would have identical impacts as the Proposed Action; DP sulfide and Lone Star projects would have similar impacts in that localized changes in topography may have microclimatic impacts on wind patterns; these are expected to be imperceptible outside the project area.	No direct, indirect, or cumulative impacts on climate on local or regional scale are expected as a result of public acquisition or management.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
PHYSICAL RESOURCES						
Air Quality	No direct, indirect, or cumulative impacts on air quality would result from this alternative. Ambient air quality is retained.	The ambient air quality is expected to decrease but stay within federal and state standards. Model-predicted emissions of criteria pollutants at a localized level during the life of the Project would not exceed standards at the process boundary or at four special receptor sites (the southern tip of the San Carlos Apache Reservation, in the town of Safford, or at the Galiuro or Gila wildernesses). No visual plume impacts expected in Gila and Galiuro Wildernesses (Class I airsheds) as a result of the project. Cumulatively, the concentration of some criteria air pollutants is likely to increase in Safford Valley as a result of growth, the Project, and RFFAs. However, ADEQ, through their permitting authority, must ensure that concentrations do not exceed applicable standards.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing air quality on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts to air quality from the disposal of selected lands; impacts of foreseeable uses at the DP/SJ Project on criteria air pollutants in the region including two Class I airsheds would be identical to Proposed Action alternative. All foreseeable uses would likely result in increased ambient concentrations of criteria pollutants but within standards. DP sulfide project would likely require a Class I air quality permit; Lone Star project would likely require a Class II air quality permit.	No direct, indirect, or cumulative impacts to air quality from criteria air pollutants as a result of public acquisition or management of the offered lands.
Geology	No direct, indirect, or cumulative impacts on geological resources would result from this alternative.	Direct, permanent impact to locatable mineral resources as allowed by the General Mining Law of 1872 and other surface management regulations. Economic mineral potential (metals and common variety minerals) of public lands will be realized under this alternative.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing mineral resources on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Mineral resources of the selected lands would become the property of PD, which currently owns 100% of 844 mining claims that encumber the selected lands. Mineral resources would be developed under the foreseeable uses through implementation of the Dos Pobres/San Juan mine, DP sulfide, and Lone Star projects. No adverse impacts to salable minerals as a result of the exchange.	Acquisition of offered lands would increase public lands available for mineral entry in the Dos Cabezas and Northwest Gila Valley LTMA; mineral entry would not be allowed on properties acquired in the Gila Box RNCA, Empire-Cienega RCA, and Tuzigoot NM.
Soils	No direct, indirect, or cumulative impacts on soils would result from this alternative.	Direct, long-term impacts to soil complexes (generally poor, low-productivity soils). Some productivity regained through reclamation. Mitigation includes stormwater control measures to limit erosion potential, watering during construction and operations to control soil loss by wind erosion, stockpiling soils for reclamation, revegetation programs, and contouring sides and tops of stockpiles to reduce wind and water erosion effects. Long-term losses of soil productivity would occur in areas not subject to active reclamation programs and would continue until natural successional processes resulted in the re-establishment of vegetation and productive soil profiles.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing soils on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct physical impacts to soils as a result of exchange; foreseeable mining uses would result in long-term reduction in soil productivity although not for soils that will be stockpiled and used as growth media at reclamation. Erosion potential of soils would increase as a result of clearing of vegetation, but resultant increased sedimentation effects are not expected outside the project area, and bedloads recover well before reaching the Gila River.	Public acquires soil resources and BLM manages productivity of soils of the offered lands.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
PHYSICAL RESOURCES						
Groundwater	No direct, indirect, or cumulative impacts on groundwater quality or quantity would result from this alternative.	Model-predicted maximum drawdown of water table is 800 feet after Year 16 centered in the San Juan pit, with the drawdown cone as defined by the one-foot contour line not reaching the Gila River, Bonita Creek, or the boundary of the San Carlos Apache Reservation. Increase in groundwater flow southward from the Reservation, peaking at 0.2 af/yr, or about 0.07 percent of estimated current flow, in Year 50; decline of water table beneath the Reservation predicted to be nearly zero. DP Seep would be destroyed. Wellhead pressure at Watson Wash artesian well is predicted to be reduced by a maximum of 0.72 ft at Year 1200. Cumulative impacts are likely but are not expected to adversely impact known production wells of other municipal or industrial water users. Magnitude of cumulative effects will be more accurately predicted in the future, as monitoring programs for the DP/SJ Project help to refine the groundwater model's predictive capabilities and as each RFFA is subjected to required environmental permitting and review. No direct, indirect, or cumulative impacts expected to existing groundwater quality through compliance during or after mining with BADCT design standards for potentially discharging mine facilities through APP permit. Risk of discharge to groundwater would be reduced by these measures but cannot be eliminated completely. (See also Indian Trust Resources discussion in this Table)	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing groundwater conditions on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts to groundwater quantity or quality as a result of the exchange. Foreseeable mining uses at DP/SJ Project would result in the same impacts as described for the Proposed Action alternative. Foreseeable mining uses at DP sulfide and Lone Star projects would likely draw on the same aquifer as the DP/SJ Project, adding to its impacts and extending them over time and area. The magnitude and significance of the physical impacts of the DP sulfide and Lone Star projects on water resources (e.g., surface flows of Gila River and Indian trust assets such as water rights and groundwater of the San Carlos Apache Tribe) would have to be estimated at the time of future federal permitting for these projects. Foreseeable mining uses are not expected to adversely impact groundwater quality because they would be subject to APP requirements.	Public acquisition of the offered lands would not directly, indirectly, or cumulatively impact groundwater quality or quantity.
Surface Water	No direct, indirect, or cumulative impacts on surface water quantity or quality, waters of the U.S., or surface flows of the Gila River would result from this alternative.	The maximum model-predicted reduction in flows in the Gila River as a result of the Project is 149 af/yr at Year 450. Of this volume, 34 af/yr is from groundwater pumping impacts, 21 af/yr is from the pit lake effect, and 94 af/yr is attributable to stormwater runoff impacts. The proposed Alternate Year Following Program to mitigate for Gila River surface flow impacts is described in Appendix F. Predicted impacts to Bonita Creek flows are nearly zero. No adverse cumulative impacts to surface water are expected upon implementation of this mitigation for physical effects to surface water. Direct and indirect impacts to drainages from sedimentation and scour resulting from stormwater retention and detention in major tributaries such as Cottonwood and Peterson Washes are not expected to reach the Gila River. Direct impacts to about 21.4 acres of waters of the U.S. and 93.2 acres of indirect impacts to waters. Direct and indirect impacts to waters of the U.S. mitigated through implementation of COE's Mitigation and Monitoring Plan (Appendix F); therefore no significant adverse cumulative impacts to waters of the U.S. A pit lake would be created at Dos Pobres and the existing pit lake at San Juan would be pumped, mined out, and would refill after the proposed mining there is complete. The pH of the water in both pits is expected to be neutral and heavy metal concentrations within federal and state standards.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing surface water resources on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Disposal of selected lands would not result in direct, indirect, or cumulative impacts on surface water quantity or quality. Foreseeable mining uses at DP/SJ Project would directly impact surface water quantity as described under Proposed Action alternative. Mitigation in perpetuity for this reduction in surface flows would preclude indirect and cumulative adverse impacts to surface water quantity in the project area region. Monitoring program will show if model predictions warrant changes in mitigation requirements. Foreseeable mining use at DP sulfide and Lone Star would contribute cumulatively to surface water quantity reductions to an unknown degree; however, mitigation requirements associated with future COE permitting, requirements of the Endangered Species Act, and the mitigate for the anticipated physical effects to surface flows (including protecting the existing water rights of downstream users and Indian tribes) would be expected to negate such impacts.	Surface water quantity and quality would not be directly, indirectly, or cumulatively affected by public acquisition of the offered lands.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
BIOLOGICAL RESOURCES						
Vegetation	No direct, indirect, or cumulative impacts to vegetation from this alternative.	A total of about 3,360 acres of land to be impacted, including about 1,931 acres of BLM land (527 acres of Sonoran Desertscrub, 1,220 acres of Sonoran Desertscrub-Semidesert Grassland Ecotone, and 184 acres of existing disturbed lands) and 1,429 acres of PD private lands (290 acres Sonoran Desertscrub, 1,026 acres Sonoran Desertscrub-Semidesert Grassland Ecotone, and 113 acres disturbed land). This alternative is unlikely to cause or promote the introduction or spread of invasive species. Cumulative impacts to vegetation in the Safford Valley are expected; however, on a regional or statewide scale these impacts are not considered cumulatively significant.	Impacts would be identical those of the Proposed Action.	This alternative would not, in itself, cause changes to the status or condition of vegetation (including invasive species) on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No physical direct, indirect, or cumulative impacts on vegetation, including invasive species, from the exchange; vegetation resources, including Walnut Spring, would be under PD management; foreseeable use impacts would be identical to those of Proposed Action, with an additional 5,059 acres of similar types of impacts in the future possible from development of DP sulfide and Lone Star projects. Foreseeable uses would contribute to minor cumulative adverse impacts to these habitats. Revegetation at reclamation is expected to offset some of the impacts to vegetation expected as a result of foreseeable uses.	Public acquisition of riparian habitats at Gila Box RNCA, wetland habitat at Tuzigoot NM, and various xeroriparian habitats in LTMAs in Safford and Tucson Field Offices would exceed acreage of such habitats disposed of with selected lands. Net loss of widespread and common upland habitats within the Safford Field Office. Vegetation resources, including any potential invasive species, on offered lands become subject to federal management practices.
Wildlife	No direct, indirect, or cumulative impacts to wildlife would occur from this alternative.	Direct impacts to game and non-game wildlife inhabiting the project area; estimated direct impacts to up to 35 mule deer and 15 javelina as a result of habitat destruction on both BLM and PD lands. No adverse impacts expected to wildlife from pit lake water quality at the Dos Pobres and San Juan Mines. A very small potential for adverse impacts to wildlife (birds, bats) exists from exposure to excess process solution impoundment; PDSI will monitor pond for wildlife use for at least 1 year to see if wildlife is adversely affected. Cumulative impacts to wildlife in the Safford Valley are expected; however, on a regional or statewide scale these impacts are not considered cumulatively significant.	Impacts would be identical those of the Proposed Action.	This alternative would not, in itself, cause changes to wildlife; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	No direct, indirect, or cumulative impacts to wildlife on selected lands due to exchange as all wildlife remains under AGFD jurisdiction regardless of land ownership; direct, indirect, and cumulative impacts to wildlife from foreseeable uses on selected lands would be identical to those of Proposed Action, plus additional similar impacts (32 - 55 mule deer lost and 12 - 24 javelina lost) would be expected as a result of potential future development of DP sulfide and Lone Star projects.	No direct impacts of exchange on wildlife on offered lands; AGFD retains jurisdiction of wildlife regardless of land ownership. Additional 3,543 acres of offered properties (except Tavasci Marsh property) would become available for game hunting in applicable AGFD hunt units. Wildlife habitats on the offered lands would be subject to federal management and protection.
Special Interest Species	No direct, indirect, or cumulative impacts to special interest species from this alternative.	No impacts to federally listed species expected. Implementation of mitigation measures as described in Appendix F for predicted physical effects on water resources is expected to preclude any potential for direct, indirect, or cumulative impacts to listed, proposed, or candidate species, or designated or proposed critical habitat. In their Biological Opinion, USFWS concurred that habitat mitigation and monitoring activities for Section 404 permit were unlikely to adversely affect listed species or critical habitat.	Impacts would be identical those of the Proposed Action.	This alternative would not, in itself, cause changes to the status or condition of special interest species; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Special status plant species would receive consideration under ESA if a federal nexus (e.g., permit or authorization) is triggered; otherwise Arizona Native Plant Law regulations would apply. Habitat for Pima Indian mallow (BLM sensitive species) goes into private ownership and management and one location is expected to be affected by foreseeable uses. Protection of federally listed animal species continues but under COE (not BLM) as lead agency in Section 7 consultation with USFWS. Nine mine features adversely impacted by foreseeable mining uses, but none are considered important bat roosts. No adverse cumulative impact is expected.	Public would acquire potentially suitable habitat for 13 federally listed species, 1 proposed endangered species, and 2 candidate species that are known to occur or may occur on the offered lands. Public jurisdiction would be extended to Tavasci Marsh, which is known to support southwestern willow flycatcher, Yuma clapper rail, and yellow-billed cuckoo, and to portions of Bonita Creek that support Gila chub and yellow-billed cuckoo. Additional areas designated as critical habitat for spikedace, loachminnow, razorback sucker, southwestern willow flycatcher, and Gila topminnow would come into public lands management through acquisition of some of the offered properties (e.g., Tavasci, Curtis, Amado).
Biodiversity	No direct, indirect, or cumulative impacts on the region's biodiversity as a result of this alternative.	No direct, indirect, or cumulative impacts on the region's biodiversity of the region are expected from this alternative.	Impacts would be identical those of the Proposed Action.	No direct, indirect, or cumulative impacts on the region's biodiversity as a result of this alternative.	No direct, indirect, or cumulative impacts on the region's biodiversity are expected from this alternative.	No direct, indirect, or cumulative impacts on the region's biodiversity are expected from this alternative.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
CULTURAL RESOURCES						
Archaeological Sites	No direct, indirect, or cumulative impacts expected as a result of this alternative.	This alternative would directly destroy or damage 37 of the 115 archaeological sites recorded on the project area (this includes 13 sites on BLM land and 24 on PD land). Thirty-six of the sites are considered eligible for nomination to the National Register of Historic Places. It is probable that at least 16 of these sites will be avoided by judicial placement of transmission line components, road alignments, and stockpiled soils. Additional sites would be lost as a result of RFFAs; however, adverse cumulative impact to the information potential of archaeological sites is not expected to be significant because of mitigation requirements under NHPA.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to existing cultural resources on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Disposal of the selected lands would affect all 61 archaeological sites on selected lands through loss of federal management. DP/SJ Project would physically impact 13 sites; DP sulfide and Lone Star could physically impact 9 sites. Mitigation for loss of federal protection and impacts of foreseeable mining uses of the selected lands would involve implementing a testing and data recovery plan for all or a representative sample of the impacted sites at the time of exchange approval. No significant adverse cumulative impact to the sites' information potential is expected because of testing and data recovery requirements.	Archaeological resources occurring on the offered lands would come under federal protection and management. This includes historic and prehistoric sites adjacent to the ruins at the Tuzigoot National Monument on the Tavasci Marsh property; sites along Bonita Creek in the Gila Box on the Curtis and Amado properties; and various sites on the offered properties in the Dos Cabezas LTMA.
Traditional Cultural Properties	No direct, indirect, or cumulative impacts expected as a result of this alternative.	Eleven Indian tribes were consulted about TCPs and sacred sites in the project area. Tribes identified 76 of the 115 archaeological sites as potential TCPs, 43 of which are located on BLM lands. Of the 76 potential TCPs, 26 would be damaged or destroyed by the Proposed Action (10 on public lands, 16 on PD lands). Four potential TCPs (AZ CC:2:200, 211, 225, and 234) have also been identified by Indian tribes as sacred sites. Three of these sites (AZ CC:2:200, 211, and 234) would be avoided under this alternative and access by tribes would be permitted with reasonable notice. No determination of eligibility as TCPs has yet been made for impacted sites.	Impacts of this alternative are expected to be identical to those of the Proposed Action.	This alternative would not, in itself, cause changes to TCPs on offered or selected lands; however, given that mining would likely occur on portions of the selected lands, impacts identical to those described under the Proposed Action are anticipated.	Disposal of selected lands would not physically impact the 43 potential TCPs, including 4 sacred sites, on the selected lands but would have regulatory implications. Sites on private lands are considered private property; as such, sites would not be subject to consideration under the American Indian Religious Freedom Act or under Exec. Order 13007 regarding sacred sites. Access to TCPs and sacred sites on the selected lands under this alternative would be controlled by PD, which has told BLM and the Four Southern Tribes that it would, with reasonable notice, allow Indian groups access to the sacred sites. Foreseeable uses of selected lands would result in impacts to TCPs identical to those described under the Proposed Action. Loss of federal protection is considered an impact and BLM will require mitigation for TCPs as described for Proposed Action. Three sacred sites would be avoided and protected in perpetuity.	Although no tribes identified any potential TCPs on the offered lands, federal protection and access would be provided to any such sites under this alternative.
SOCIOECONOMIC RESOURCES						
Population and Demographics	No direct, indirect, or cumulative impacts.	Direct, indirect, and cumulative but minor impacts in the Safford area by increasing population by 3.1% (from 1995) with the addition of an estimated 145 households, or 448 individuals. Anticipated growth and the subsequent increased demand upon public services and schools resulting from the Proposed Action are relatively small percentages of the growth projected for Graham County area from 1995 to 2005 without the Project. New demands on infrastructure should be adequately met through increased tax revenue generated directly and indirectly by the Project. Direct and indirect benefits to local population, including minority and low-income groups, by increased general employment opportunities. Because the largest populations of Native Americans are geographically distant from the Safford area, this group as a whole would be less affected than nearby Hispanic populations in the Safford Valley.	Direct and indirect impacts expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts.	No direct, indirect, or cumulative impacts to population resulting from exchange. Implementing the foreseeable uses at Dos Pobres/San Juan would result in the impacts described under the Proposed Action. Foreseeable uses at DP sulfide and Lone Star orebodies would also likely affect population size and demographics in the Safford area, but as no information is yet available about the scale of the potential future mining operations, there is insufficient information available to predict the magnitude or significance of those effects.	No impacts on population size or demographics in or near the offered lands.
Local and Regional Economy	No direct, indirect, or cumulative impacts.	Direct, indirect, and cumulative beneficial impacts stemming from increased employment and tax revenues in the Safford area: construction phase employment would average 470 full-time jobs over 15 mos.; long-term direct and indirect employment would total 644 jobs by the end of the Project; for life of Project, PDSI's cumulative payroll would total \$214 million; cumulative local tax revenue would total \$57.6 million; PDSI would pay a cumulative total of over \$420 million in federal, state, and local taxes (all figures are estimates in 1997 dollars). No adverse cumulative impacts to the local and regional economy are expected.	Direct and indirect impacts expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts.	No direct, indirect, or cumulative impacts on employment and income expected from the exchange. Graham County would lose \$19,634 (1997 \$) in PILT payments and gain an undetermined, but likely higher amount in private property tax revenue. Impacts of foreseeable uses at the DP/SJ Project are expected to be identical to those of the Proposed Action. Potential future development of the DP sulfide and Lone Star orebodies would likely affect the local and regional economy, but insufficient information is available at this time to predict the magnitude or significance of those effects, but they are not expected to be adverse.	No impacts on local or regional employment or income in or near the offered lands. Pima, Graham, Santa Cruz, Cochise, and Yavapai counties would lose tax revenue from the federalization of the offered lands but these would be offset by PILT. Net change in tax revenues (1997 \$) for the counties after PILT are not expected to be significant on a county-wide basis: Graham: +\$972; Pima: -\$1,661; Santa Cruz: -\$823; Cochise: +\$181; Yavapai: -\$4,264.

Table 2-15, continued. Comparative Summary Table of Impacts of Alternatives for the Dos Pobres/San Juan Project

Resource/Issue	Mine Plan Alternatives Set			Land Exchange Alternatives Set		
	No Action	Proposed Action	Partial Backfill of San Juan	No Land Exchange	Land Exchange Alternative	
					Selected Lands	Offered Lands
SOCIOECONOMIC RESOURCES						
Infrastructure	No direct, indirect, or cumulative impacts.	Direct, indirect, and cumulative but minor impacts to housing, schools, utilities, and emergency response services in the Safford area. The Project is predicted to generate an increase of 3.1% in the local population; increases in local tax revenues resulting from the Project would be disproportionately higher than this population growth resulting from the Project. This increase in revenues is expected to offset any potentially adverse impacts to existing infrastructure generated by the relatively small increase in population attributable to the Project. No adverse cumulative impacts are expected.	Direct and indirect impacts expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts.	No effects on local infrastructure from disposal of the selected lands. Foreseeable uses at DP/SJ Project would have identical effects on local infrastructure as those described under the Proposed Action. Potential future development of the DP sulfide and Lone Star orebodies may also affect the local infrastructure in a similar manner, but no information is yet available about the scale of these possible future mining operations, so predictions cannot be made regarding the magnitude or significance of those effects.	No impacts on infrastructure in or near the offered lands.
Transportation	No direct, indirect, or cumulative impacts.	No direct impacts. Indirect and cumulative impacts would be limited to a small overall increase in vehicle and truck traffic in the Safford area, most noticeably on the Safford-Bryce and Airport roads, but this increase is not expected to reduce the Level of Service (LOS) ratings of the roads. All roads and intersections would continue to operate at acceptable levels of service. Increases in local tax revenues resulting from the Project are expected to offset any adverse impact to pavement conditions caused by increased truck traffic.	Direct and indirect impacts expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts.	No impacts expected from exchange on traffic and transportation. Indirect and cumulative impacts of the foreseeable uses at DP/SJ Project would be identical to those of the Proposed Action. Potential future development of the DP sulfide and Lone Star orebodies would likely affect transportation in the Safford area, but no information is yet available about the scale of the mining operations, so predictions cannot be made regarding the magnitude or significance of those effects.	No impacts on transportation in or near the offered lands.
INDIAN TRUST RESOURCES						
Indian Trust Assets	No direct, indirect, or cumulative impacts to Indian trust assets.	No direct, indirect, or cumulative impacts to water rights to the Gila River held by the San Carlos Apache Tribe and the Gila River Indian Community are expected. Predicted long-term physical effects on Gila River surface flows are avoided through implementation of the Alternate Year Fallowing Program. The Program will provide 480 af/yr of surface flows in perpetuity to offset the predicted total maximum effect to the Gila River of 149 af/yr resulting from the Project's groundwater pumping and stormwater diversions; this is more than 3 times the peak predicted impact. The excess benefit in reduced water consumption for agriculture (331 af/yr) will result in a net annual increase in surface water available in the Gila River and in the San Carlos Reservoir. The Project's predicted groundwater drawdown on the San Carlos Apache Reservation is short-term and unmeasurable, therefore, no significant, adverse impacts to this trust asset are expected.	Impacts expected to be identical to those of the Proposed Action.	No direct, indirect, or cumulative impacts to Indian trust assets.	No direct, indirect, or cumulative impacts to Indian trust assets as a result of the land exchange itself. Foreseeable use impacts from Dos Pobres/San Juan Project and mitigation for physical effects to Gila River surface flows are identical to those of the Proposed Action and preclude adverse impacts to trust assets. Foreseeable uses at DP sulfide and Lone Star projects would be expected to result in continued or increased reductions of Gila River flows if groundwater continues to be the water supply source and may affect groundwater under the San Carlos Apache Reservation; however, insufficient information exists at this time to predict whether or to what degree such an impact would occur. Future environmental analyses of these possible projects will occur under future federal and state permitting processes and specific analyses of groundwater and development of mitigation, if warranted, would be required at that time.	No Indian trust resources are known to be associated with offered lands. No direct, indirect, or cumulative impacts expected to trust resources through public acquisition of the offered lands.